INFORMATION SYSTEM APPLICATION DEVELOPMENT: A CASE STUDY OF CV. BULUK LUPA SME

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ABSTRACT

This study involves the creation and deployment of a Laravel framework-based web-based management information system for a business entity referred to as Buluk Lupa. The website serves as a platform for all transactions in Buluk Lupa, as well as a medium for promotion and storage of product and stock data online. The website employs a bootstrap with the Magenta theme, organizing the appearance of the website like a table while also providing separate pages for each menu item. The website also includes a shopping cart feature for users to purchase products, as well as a cookie system to streamline the user experience during login and order placement. The website underwent black box testing to ensure all functions align with the intended requirements. The text also discusses the economic feasibility analysis of Buluk Lupa's products and the proposed system modifications to make the existing information system more effective and provide a positive impact on sales and data collection, affecting Buluk Lupa's growth.

Keywords**:** Indonesia SME; Laravel; web-based management information system; security; System Development Life Cycle

1   INTRODUCTION

Small and medium enterprises (SMEs) play a significant role in job employment in West Java. They contribute to 14% - 15% of the Gross Regional Domestic Product (GRDP), amounting to Rp 231.764 billion, and aid in the economic growth of West Java by 4.21% [1]. West Java, a province in Indonesia, contributes the largest GRDP, making it one of the most important provinces in the country due to its substantial impact on the state econemy. One of the indicators of SMEs' performance is the credit sector, which accounts for Rp 73.5 trillion or 24.63% of the total credit [2].
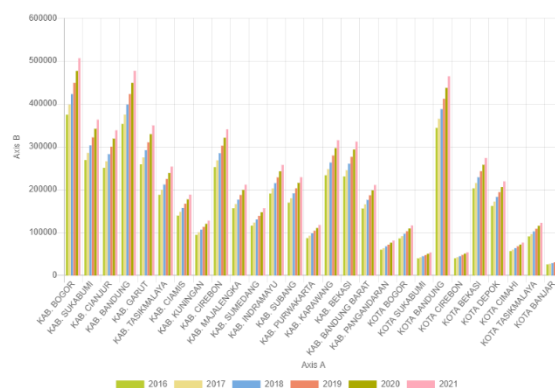

Figure 1. Total of mall Medium Enterprise and Industries in West Java 2016 – 2021 [3]

The development of SMEs in West Java as seen in
Figure 1 serves as a solution to reduce the probability of global financial turmoil and contributes to improving Indonesia's economy. [4] state that the competition for local products has become more intense due to the Asean Economic Community's movement, which has opened

new avenues for foreign products to enter domestic competition. Consequently, SMEs must enhance their competitiveness by preparing effective marketing strategies and adopting suitable technology applications [5].

In the current era, the use of management information systems (MIS) simplifies and accelerates management activities with a lower risk of damage and failure [6]. A survey conducted by Asosiasi Penyedia Jasa Internet Indonesia in 2022 reveals that out of 215.63 million internet users in Indonesia, 50 percent is utilizing the internet as a medium for goods and services transactions, or e-commerce [7]. This trend indicates the potential for increased marketing through technological advancements, allowing businesses to implement technologies to boost their profits. MIS can be applied to various aspects of a company, including management, transactions, and administration, resulting in organized data collection, efficient data validation, and real-time access to data [8].

Buluk Lupa, an SME located in the Kiaracondong area of Bandung, West Java, specializes in the production of tempeh chips in various flavors. In 2016, Buluk Lupa focused on selling its products through online media, with monthly sales reaching 2000 - 3000 packs. The market conditions and consumer potential for tempeh products have allowed Buluk Lupa to compete with other products in Bandung and abroad. Although the company has implemented effective management practices, there are still areas for improvement and potential for further development.

Technology and management adjustments in Buluk Lupa have room for development, particularly in reseller management systems, production finance, and transactions. The potential for business growth and network expansion could decline if the company continues to rely on manual data collection methods for products, resellers, stock, and sales, which could result in a considerable risk of data loss or manipulation. Any damage or alteration of Buluk Lupa's data could have a significant impact on sales and profits. Consequently, the company's management system requires engineering processes, modifications, or latest information system designs to eliminate existing constraints.

The engineering and modification of information systems should be web-based to facilitate faster communication processes for obtaining the latest information [9]. The focus should be on data collection, reseller, and fiscal management of Buluk Lupa that can be further developed. The database design should employ PHP, an open-source programming language, and utilize MySQL as the open-source platform for the Database Management System (DBMS). The proposed system modifications will make the existing information system more effective and provide a positive impact on sales and data collection, affecting Buluk Lupa's growth.

To implement information systems in a company's production management, supporting data based on the current state of Buluk Lupa must be considered. One relevant data source is the economic analysis of Buluk Lupa's products, which necessitates conducting an economic analysis to understand the actual state of the business. This analysis can help maximize market potential and assist Buluk Lupa in future business development.

2   RESEARCH METHODOLOGY

To address existing problems and field conditions, a system design method (system engineering) was employed, utilizing information system design based on the System Development Life Cycle (SDLC) method [10] and Object-Oriented Analysis [11]. The SDLC development method consists of five stages: system investigation, system analysis, system design, system implementation, and system maintenance [10].

2.1. System Investigation

The purpose of system investigation is to identify and address problems and to prepare for subsequent steps. According to [12], this phase This phase includes planning and feasibility study stages.

a. Planning Phase, Information systems planning is based on the need for data collection systems to assist resellers or consumers in working more effectively and efficiently when reporting sales, facilitating buying, and selling processes. The goals of information system design are to monitor product inventory, oversee product flows, and support users in making informed decisions and acting in case of undesirable events. Information should be presented quickly and accurately to optimize work processes.

b. System Analysis, The system analysis stage aims to analyze the required information from the owner, reseller, and end-user (the consumer). This activity also evaluates the system's capacity to be built and adjusted to meet users' needs while maintaining the operational functions of the system to be developed. This stage allows for the identification of user-specific needs.

c. System Design, After gathering necessary information and completing the identification step, system design follows. This stage involves constructing the system according to desired specifications and transforming it into a program tailored to users' needs.

d. Database Design, Database design creates an effective and efficient database system, enabling users to easily operate the application program. This system is designed to fulfill all, or part of the information required by users.

e. Process Design, Process design involves constructing the necessary programs and procedures for the information system.

f. User Interface Design, User interface design encompasses creating the program's visual aspects with consideration for aesthetics.

2.2. System Implementation

Once the information system has been designed, it can be implemented. The implementation phase includes procuring hardware and software, developing software, testing programs and procedures, creating documentation, and installing necessary programs. In the initial stages of implementation, the analysis results are transformed into an application that aligns with the proposed solution. This stage involves programming (coding) for web application development. Before running the program, system verification is required to differentiate between users and end-users. System tests and procedures are conducted to ensure the program's performance aligns with the system analysis results, and documentation is created to illustrate the system's operation. Verification is performed until the system aligns with the resulting output [12]–[14].

2.3. System Maintenance

System maintenance is the final stage in the system development life cycle, encompassing maintenance activities, evaluation, and appropriate system modifications. System maintenance occurs during and after the implementation of the system design process [13]. In this step, the system is evaluated both online and offline to identify any errors or issues within the program. If any errors are detected during testing, repairs are made.

The economic analysis calculations follow the methodology of [15]. To be deemed viable, a business or project must undergo an economic feasibility analysis to determine the current state of the business. The economic feasibility analysis also ascertains whether the business has met the requirements to achieve profit within an appropriate timeframe. Feasibility analysis can additionally provide data for future business planning. The stages of the economic analysis process can be observed in Figure 2 below:
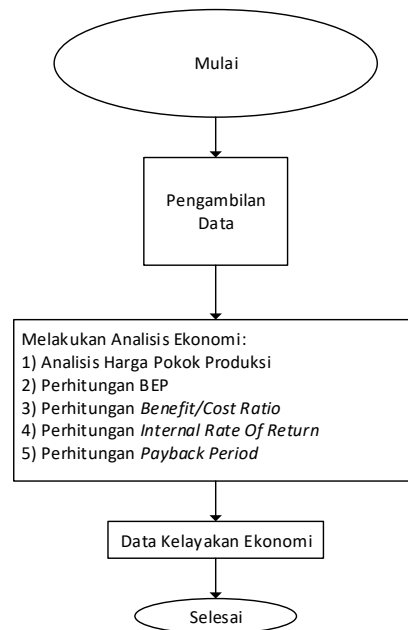
Figure 2. Flow Diagram of Economic Feasibility Analysis

3   RESULTS AND DISCUSSIONS

3.1. Home View

The management and financial data collection system that has been designed is a user-friendly, dynamic website with various features accessible. The information system is capable of processing order data, stock storage, and transaction activities conducted by Buluk Lupa.

The author utilized XAMPP and MySQL to build the information system website and employed a framework called Laravel to facilitate website creation. A framework is a tool in programming languages for web or desktop applications that simplifies and consolidates multiple lines of coding for easy accessibility [16], [17]. The use of a framework, such as Laravel, makes website design more efficient and structured. The result of this research is a web-based management information system using the Laravel framework for Buluk Lupa, requiring appropriate hardware, software, and internet access. To access the website, users can navigate web pages in their browser. The website serves not only as a platform for all transactions in Buluk Lupa but also as a medium for promotion and storage of product and stock data online. The home page view of the information system is displayed in Figure 3.
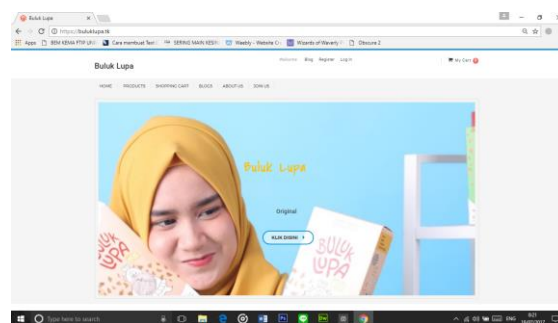

Figure 3. Home Page View of the Designed Information System

The designed information system employs a bootstrap with the Magenta theme, organizing the appearance of the website like a table while also providing separate pages for each menu item. The home page view contains six menus: home, products, shopping carts, blogs, about us, and join us. Each menu offers distinct features, catering to various user needs.\
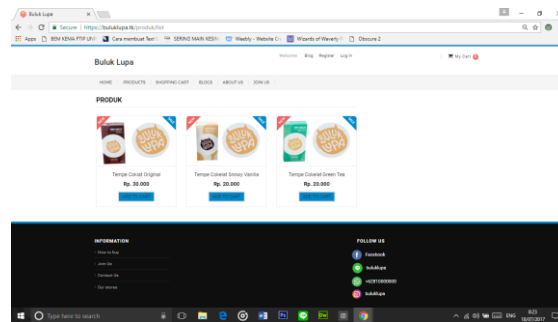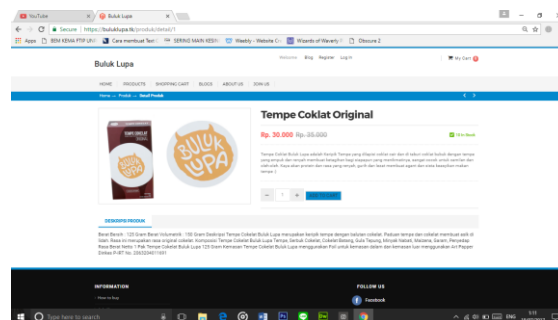
Figure 4. Product View List

Figure 5. Detailed Product View

Figure 4 and Figure 5 presented the product page view that provides detailed information about the products sold by Buluk Lupa, including food compositions and stock values available for every user to see on the website.
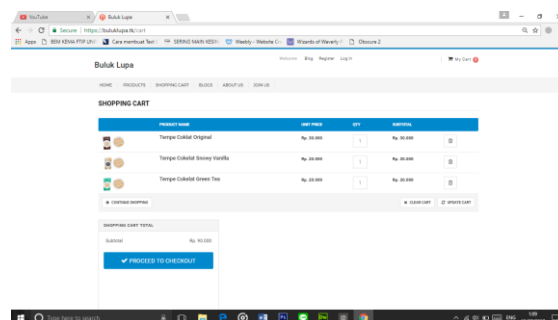

Figure 6. Shopping Cart Page View

The shopping cart view in Figure 6 includes all items selected in the product page and serves as the primary interface for transactions. This page displays the total goods and prices that the user must pay, with options for adding or removing items before proceeding with the order process. Once the buyer or user completes verification and checking, they can proceed with the checkout and payment process.
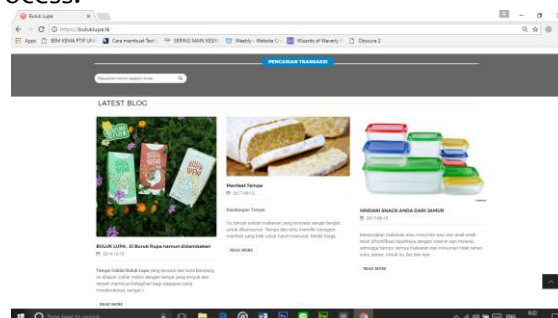
Figure 7. Blogs Page View

The blogs, about us, and join us pages provide users or consumers with more in-depth information. The blogs page seen in Figure 7 contains news related to Buluk Lupa and media coverage on television or other outlets. The about us page offers information and a company profile of Buluk Lupa and its owner. The join us page provides details on registering to become a reseller or obtaining Buluk Lupa's contact information for potential collaboration.

In the designed information system, there are different permission levels for each system user, as described previously. The admin, typically the employee or owner of Buluk Lupa, holds full access rights to all applications or menus related to management and use of the information system. Resellers have multiple access rights and ease in operating the information system but must first register and be verified by the admin. Visitors (public) are consumers or buyers with limited access who can perform transactions to purchase Buluk Lupa products.

3.2. The Order Process Through the Designed Information Systems

One of the primary objectives in designing these information systems is to facilitate faster and more secure transactions. The transaction process through the designed information system follows this sequence: Buyers can view the product catalog on the product page, selecting the desired product to purchase. The page displays the total quantity of products to be bought and information about product availability as seen in Figure 8 below:

Figure 8. Product Detail View

Buyers can proceed to the shopping cart and initiate the checkout process. During the checkout process, buyers must fill out the shipping data form as seen in Figure 9.
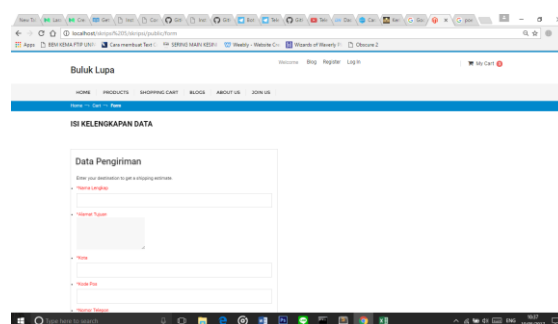

Figure 9. Shipping Data Form

Subsequently, the system displays payment details and prompts the buyer to confirm the payment.
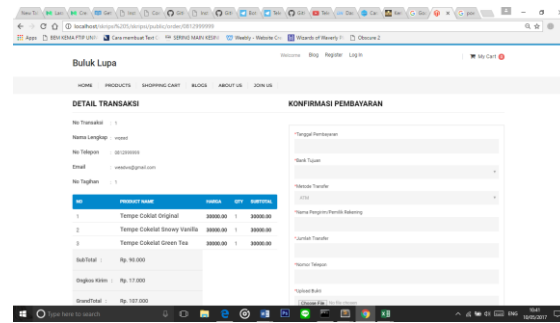
Figure 10. Payment Details

Figure 10 show that buyers have the option to cancel the order by clicking the "Clear Cart" button or print the invoice order by clicking the "Print" button. Buyers can complete the payment by transferring funds and submitting the necessary payment confirmation details. After processing the payment, buyers can search for their invoice by entering their mobile phone number in the search order number field as seen in Figure 11.
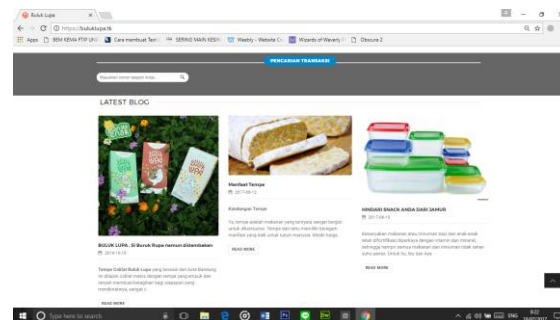

Figure 11. Transaction Search Column

Upon receiving the payment confirmation, the admin conducts a verification process to ensure the transaction's validity. Once the verification is complete, the transaction is considered successful.

3.3. Reseller Registration Process and Stock Data Collection Through Designed Information System

Resellers play a crucial role as partners of Buluk Lupa in facilitating buying and selling transactions. The benefits derived from resellers significantly impact the cash flow of Buluk Lupa. However, the existing system presents a deficiency in providing accurate stock information for resellers, causing obstructions in the supply chain and sales due to miscalculations in production, which affects sales performance.

The reseller registration process seems in Figure 12 is incorporated in the designed information system to facilitate convenient registration, accessible to candidates anytime and anywhere.
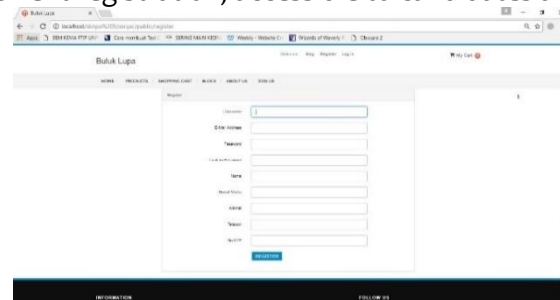

Figure 12. Reseller Registration Page View

To become a Buluk Lupa reseller, candidates complete the registration form on the designated webpage. After submitting the form, they await the verification process conducted by the Buluk Lupa admin before being confirmed as resellers (Figure 13).
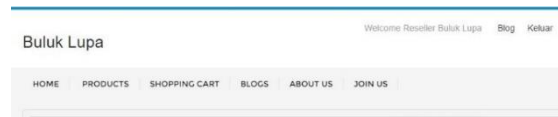

Figure 13. Header of the Website if Reseller Has Been Verified

Once successfully logged in as Buluk Lupa resellers, they can engage in reseller-related activities. Resellers have similar functions and access to the Buluk Lupa website as consumers but benefit from special pricing and ease in making transactions for every Buluk Lupa product purchase.

The designed information system also includes a stock data collection function for easy access. In the existing system, the stock management process is conventional and not up to date, with data collection being poorly recorded and disorganized due to the reliance on paper or notes for each purchase by resellers or consumers. The designed information system stores stock data on the Buluk Lupa server, allowing for adjustments in stock information with each transaction or.
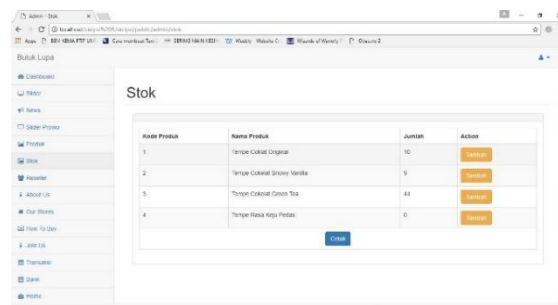

Figure 14. Stock View in the Admin Panel

Only admins can add or reduce stock in the designed information system. They must log in before entering and collecting production results to input stock data into the server. The total stock for each product is displayed on the product detail page in the top right corner purchase as seen in Figure 14.

After completing the login process, the admin accesses the admin panel and selects the existing stock panel. The stock panel displays a list of products and the quantity of available or stored stock in the information system.

The stock panel view shows the number of available products and stocks in accordance with the existing database. The panel also includes an "Add" button for admins to input values and combine them with existing stock values. This panel operates on an addition-based system, where each value entered is directly added to the existing stock value. For example, if the listed value is ten and the admin clicks the "Add" button to input a value of 5, the resulting value will be fifteen. However, if the admin inputs -5, the resulting value will be five due to the negative input.

3.4. System Verification Process of Sales Transaction and Data Collection

Transactions made by consumers or resellers undergo a preliminary verification process by the admin to ensure the necessary administrative data is complete and consistent with existing conditions. The admin reserves the right not to proceed with orders from consumers or resellers in cases of data inconsistency. Transactions are categorized as either pending or successful based on their status.

Figure 15 show payment confirmation form that must be completed for a transaction to be verified and accepted.

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Figure 15. Payment Confirmation Form View

Once the payment confirmation form is filled with accurate and appropriate data, the consumer waits for the admin to check the information and provide verification for the transaction to proceed. Figure 16 illustrates a completed confirmation form awaiting admin verification for the order to be processed and the product to be sent to the reseller or consumer.

Figure 16. Order Transaction View if The Receipt Has Been Uploaded

The admin accesses the admin panel to verify the required transactions. After entering the admin panel, they select the transaction panel, which displays all transactions entered the system, sorted by transaction serial number. Transactions in this column remain unpaid until a transfer receipt is provided. Figure 17 below shows the transactions page view on the admin panel.

Figure 17. List Transaction View on Admin Panel

For each transaction with a completed payment confirmation form, a "Proof of Payments" button appears in the action column to check data and verify the transaction. If the payment confirmation form is not completed, the "Proof of Payments" button will not be displayed. The "View Proof of Payments" button directs the admin to detailed transactions, including phone numbers and transfer receipts. The admin then reviews and adjusts the transfer receipts according to the destination bank and the amount paid. If the details match, the transaction is verified, and the product is delivered. Figure 18 displays the payment confirmation page when checking the transfer receipt and transfer amount for verifying a Buluk Lupa transaction.
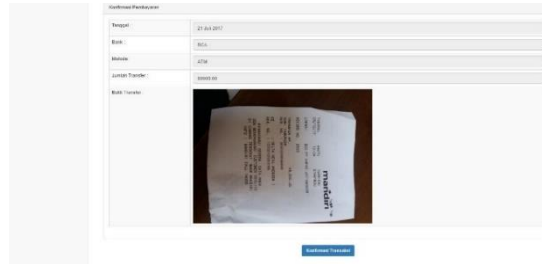
Figure 18. Payment Confirmation Page View in The Admin Panel

Once a transaction is verified, it moves to the successful transaction column, and the transaction status is updated to "Paid," initiating the delivery process. All transaction data can be downloaded as PDF files for pending and successful transactions, contributing to Buluk Lupa's data collection. The format of the downloaded transaction data file is shown in Figure 19below.

Figure 19. Transaction Data Print View

3.5. Process of System Admin

The admin system serves as a centralized platform for managing transactions, stock, and information displayed on the Buluk Lupa website. The website's system admin is structured as a panel with several menus, each containing data from different pages on the site. These menus facilitate the management of website settings. To access the admin page, users with admin privileges log in similarly to resellers and enter their admin credentials (Figure 20). Once successfully logged in, they are directed to the main page, which displays a new navigation menu labeled "Admin" leading to the admin panel. The login screen for the Buluk Lupa website is illustrated below.
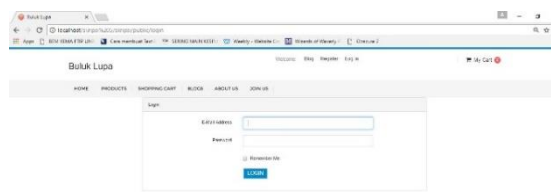
Figure 20. Login Screen of Buluk Lupa Website

Admin users are responsible for updating data displayed on the website, such as promotional information, new product additions and descriptions, reseller settings, and stock settings. The admin panel also enables printing of data for active or inactive registered transactions or reseller activities from Buluk Lupa. The dashboard view in the admin panel for the designed information system is presented in Figure 21 below.
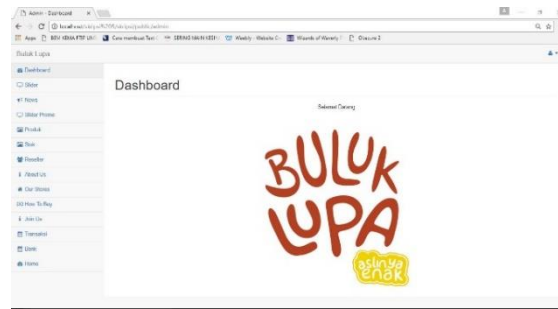
Figure 21. Dashboard View in Admin Panel of Buluk Lupa Website

The admin panel comprises fourteen menus, each with its own view and unique function tailored to Buluk Lupa's requirements for displaying content on the designed website. The menus on the admin panel include:

- Dashboard: Home view on the admin panel,
- Slider: Controls the main slider on the Buluk Lupa website homepage, allowing for image and text modifications,
- News: Manages the content of the news section or blog pages on the Buluk Lupa website,
- Slider Promo: Controls the slider section containing promos on the main page of the Buluk Lupa website,
- Product: Manages the display of products and product pages, including detailed data and information about Buluk Lupa products,
- Stock: Enables entry of available stock for each product sold by Buluk Lupa, with an option to print existing total stock,
- Reseller: Displays registered resellers on the website, with options to activate, deactivate, or remove resellers and print reseller data,
- About Us: Manages the About Us view on the Buluk Lupa website,
- Our Stores: Manages the Our Stores view on the Buluk Lupa website,
- How To Buy: Manages the How to Buy view on the Buluk Lupa website,
- Join Us: Manages the Join Us view on the Buluk Lupa website,
- Transaction: Records every transaction made through the website, with options to print pending or successful transactions,
- Bank: Controls the display of bank options on the transaction page and payment confirmation on the Buluk Lupa website,
- Home: Returns to the main page of the Buluk Lupa website.

3.6. Database on Information Systems of Buluk Lupa.

The information systems of Buluk Lupa employ a MySQL database for data storage. This database contains several tables designed to store data utilized by the website or admin for various Buluk Lupa requirements in the data collection process. The functions of each table are outlined in the Table 1 below.

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Table 1. Existing Tables in Buluk Lupa Information Systems

Database	Table	Function
Buluklupa	bank	Place to Store bank information that will be displayed on the website.
	carts	Place of data storage products that have entered into shopping carts when making an order.
	confirmations	The place of transaction data storage that has filled out the payment confirmation form and waiting for the admin verification.
	migrations	Place for table migration process needed by Laravel to create a table in phpmyadmin.
	news	Place to store detailed information that will be displayed on the Blogs page.
	orders	Storage of all transaction data that has been entered, whether it is pending or already paid.
	order_products	Place for total product that have been ordered.
	pages	Storage of information materials on the About Us, Our Stores, How To Buy, and Join Us pages.

products	Storage of detailed product data of Buluk Lupa that will be displayed on the website.	
slider	Storage of material information that will be displayed in the slider on the main/home page	
slider_promo	Storage of material information that will be displayed in the slider promo on the main/home page.	
stock	Storage of available product stock data in Buluk Lupa website.	
users	Data storage of Admin and resellers that have been registered on the website of Buluk Lupa.	

The functions of each table mentioned above are explained according to their specific requirements, with some tables exhibiting relationships with others. The order and order product tables, for instance, are interconnected during data retrieval on the website. The order table contains data from users who have purchased Buluk Lupa products, while the order products table represents the quantity of products entered in accordance with the transactions in the order table. Similarly, the stock table adjusts its data in relation to the order table; when transactions are present in the order table, the stock quantity decreases accordingly.

3.7. System Security and Black Box Testing

In the development of any web-based information system, significant consideration is given to designing and implementing a robust security system. This particular web information system ensures security throughout every process encountered [18]. The website is equipped with SSL (Secure Socket Layer) technology, which ensures that any data input or transmitted via the website undergoes encryption, thereby enhancing data security against potential external threats.

Additionally, the website employs a cookie system, which streamlines the user experience during login and order placement via the shopping cart [19]. If a user exits the website while an order remains in the cart, the system retains the order information for a duration of one hour before the data is lost, necessitating re-entry by the user. This feature is also applied to resellers logging onto the website; each reseller is allocated a one-hour time frame from the moment they log in. Once this time elapses, the system automatically logs out the reseller and exits the website as an added security measure.

Black box testing is an evaluation method applied to the functional specifications of a web-based system, which involves examining each user interface to ensure that all functions align with the intended requirements [14].

Table 2 presented table illustrating the black box testing conducted on the Buluk Lupa website:

Table 2. Black Box Testing on Information Systems of Buluk Lupa

No	Testing	Test Case	Expected Results	Test Results
1	Select Buluk Lupa men	Click Buluk Lupa text	Return to login page	Match
2	Login Screen	Click Login menu	Go to login page	Match
3	Login without filling in the password	Login menu and fill in data without a password	A statement appears that you must fill in the password field.	Match
4	Login with wrong password	Login with wrong password	The system will not load the admin page and bring up the login page again.	Match
5	Login with correct password (admin)	Fill in admin email and password	The system will enter the main page as admin	Match
6	Login with correct password (Reseller)	Fill in reseller email and password	The system will enter the main page as a reseller.	Match
7	Adding products into Shopping Cart	Clicking the "Add to Cart" button on the product on the main page	The product will be stored in Shopping Cart on the top right.	Match
8	Reseller Registration	Click the register button on the main page	Register page form	Match
9	Incomplete data entry for reseller form	Registering as reseller with empty or incomplete data	An error appears in the section that needs to be filled in and is not registered in the system.	Match

10	View Product details	Clicking on product details on the Buluk Lupa website	The product details page will appear visible	Match
11	Order lookup with phone number	Entering the order lookup number with words instead of numbers	The search process will not be performed and return to the main page	Match
12	Cart Update button on Shopping Cart	Update the order cart if there are additional orders	Order will be updated	Not Match
13	Clear Cart Button on Shopping Cart	Delete an existing order in the Shopping Cart	The order will be deleted from the Shopping Cart and return to the main page	Match
14	Replace or add Slider content for display on the Main page (log in as admin)	Update the slider on the admin panel by entering images and text in the available fields	Once all data has been filled in, clicking the update button and the slider on the main page will be replaced or increased.	Match
15	Entering words or letters when inputting stock on the admin panel	On the amount of stock entered, input words instead of numbers	Stock does not change and remains because it is not a number that is entered	Match
16	Reseller Activation	Activate resellers who register themselves by clicking the "Activate" button	Resellers who have been activated are able to enter the website as resellers.	Match
17	Print button on the transaction menu	Print the transaction page in PDF form	Print results of the transaction successfully downloaded with PDF file format	Match

4   CONCLUSIONS

4.1. Conclusions

Examining the design and implementation of a web-based management information system for Buluk Lupa, which utilizes the Laravel framework, reveals that the system is intended to streamline the management and financial data collection processes for the company, as well as provide a platform for online transactions and product promotion. The development of the system was guided by the System Development Life Cycle (SDLC) method and Object-Oriented Analysis (OOA), with a focus on economic feasibility analysis and the use of web-based information systems to improve communication and data collection processes.

The economic feasibility analysis conducted for Buluk Lupa revealed the need for a more efficient and structured management and financial data collection system. The proposed web-based information system was designed to address these needs, with features that include order processing, stock storage, and transaction activities. The system was built using the Laravel framework and MySQL as the open-source platform for the Database Management System (DBMS). The proposed system modifications are expected to have a positive impact on sales and data collection, contributing to the growth of Buluk Lupa.

The development of the system followed the SDLC method, consisting of five stages: system investigation, system analysis, system design, system implementation, and system maintenance. The system investigation phase involved identifying and addressing problems and conducting a feasibility study. The system analysis phase focused on gathering and analyzing data to determine system requirements. The system design phase involved designing the system architecture and user interface. The system implementation phase involved building and evaluating the system, while the system maintenance phase involved ongoing support and maintenance.

The web-based information system designed for Buluk Lupa employs a bootstrap with the Magenta theme, organizing the appearance of the website like a table while also providing separate pages for each menu item. The home page view contains six menus: home, products, shopping carts, blogs, about us, and join us. Each menu offers distinct features, catering to various user needs. The product page view provides detailed information about the products sold by Buluk Lupa, including food compositions and stock values available for every user to see on the website. The shopping cart view includes all items selected in the product page and serves as the primary

interface for transactions. The blogs, about us, and join us pages provide users or consumers with more in-depth information.

The system also employs security measures to protect against potential external threats, including a cookie system that streamlines the user experience during login and order placement via the shopping cart. Black box testing was conducted to evaluate the functional specifications of the system, ensuring that all functions aligned with the intended requirements.

4.2. Suggestions

- Based on the information from the link, here are some bullet points suggesting what can be improved for future research:
- Conduct a more in-depth economic analysis of Buluk Lupa's products to better understand the actual state of the business and maximize market potential.
- Develop and implement web-based information systems for faster communication processes and more efficient management practices, particularly in reseller management systems, production finance, and transactions.
- Utilize open-source programming languages and platforms, such as PHP and MySQL, for database design and management system development.
- Implement a web-based management information system using a framework, such as Laravel, for more efficient and structured website design.
- Ensure robust security systems are in place for any web-based information system, such as SSL technology for data encryption.
- Conduct an economic feasibility analysis to determine the current state of the business and whether it has met the requirements to achieve profit within an appropriate period.

REFERENCES

[1]   T. Tambunan, "Recent evidence of the development of micro, small and medium enterprises in Indonesia," *J. Glob. Entrep. Res.*, vol. 9, no. 1, p. 18, 2019.

[2]   L. Warlina, S. Luckyardi, E. S. Soegoto, S. Supatmi, and F. H. Hassan, "Marketing Strategy for Local Superior Commodities and Regional Economic Contributions, Indonesia," *J. East. Eur. Cent. Asian Res.*, vol. 9, no. 1, pp. 1–9, 2022.

[3]   Dinas Koperasi dan Usaha Kecil, "Jumlah Usaha Mikro Kecil Menengah (UMKM) Berdasarkan Kabupaten/Kota di Jawa Barat," 2022. https://opendata.jabarprov.go.id/id/dataset/jumlah-usaha-mikro-kecil-menengah-umkm-berdasarkan-kabupatenkota-di-jawa-barat (accessed Feb. 14, 2023).

[4]   S. Y. Chia, "The ASEAN economic community: Progress, challenges, and prospects," *A World Trade Organ. 21st century*, pp. 269–315, 2014.

[5]   I. J. Akpan, E. A. P. Udoh, and B. Adebisi, "Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic," *J. Small Bus. Entrep.*, vol. 34, no. 2, pp. 123–140, 2022.

[6]   C. Loebbecke and A. Picot, "Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda," *J. Strateg. Inf. Syst.*, vol. 24, no. 3, pp. 149–157, 2015.

[7]   APJII, "Profil Internet Indonesia 2022," *Apji.or.Od*, no. June, p. 10, 2022, [Online]. Available: apji.or.id

[8]   I. Ardiansah, A. Yohari, and D. M. Rahmah, *Analisis dan Perancangan Sistem Informasi Ketersediaan Pisang Lokal Berbasis Web*. CV. Cendekia Press, 2022.

[9]   C. A. de Mattos, K. O. Kissimoto, and F. J. B. Laurindo, "The role of information technology for building virtual environments to integrate crowdsourcing mechanisms into the open innovation process," *Technol. Forecast. Soc. Change*, vol. 129, pp. 143–153, 2018.

[10]   M. Kramer, "Best practices in systems development lifecycle: An analyses based on the waterfall model," *Rev. Bus. Financ. Stud.*, vol. 9, no. 1, pp. 77–84, 2018.

[11]   A. Dennis, B. Wixom, and D. Tegarden, *Systems analysis and design: An object-oriented approach with UML*. John wiley & sons, 2015.

[12]   R. Stair and G. Reynolds, *Principles of information systems*. Cengage Learning, 2020.

[13]   E. R. Suteja and L. C. Munggaran, "PENERAPAN PEMELIHARAAN SYSTEMS MAINTENANCE LIFE CYCLE BANK SWASTA NASIONAL BERDASARKAN IEEE DAN ISO," *JISICOM (Journal Inf. Syst. Informatics Comput.*, vol. 4, no. 1, pp. 46–54, 2020.

[14]   A. Jauhari, D. R. Anamisa, and F. A. Mufarroha, *Rekayasa Perangkat Lunak*. Media Nusa Creative (MNC Publishing), 2022.

[15]   R. Galliers and D. E. Leidner, *Strategic information management: challenges and strategies in managing information systems*. Routledge, 2014.

[16]   I. Ardiansah and M. T. Koeryaman, "Rancang Bangun Sistem Informasi Berbasis Web Sebagai Panduan dan Rekam Data Nutrisi Ibu Hamil," *J. Ilm. KOMPUTASI*, vol. 17, pp. 95–108, 2018, [Online]. Available: https://ejournal.jak-stik.ac.id/index.php/komputasi/article/view/351

[17]   R. Habibi and A. Suryansah, *Aplikasi prediksi jumlah kebutuhan perusahaan*, vol. 1. Kreatif, 2020.

[18]   I. Ardiansah, R. Kastaman, S. H. Putri, T. Pujianto, and R. Andrianto, "Pengembangan Sistem Informasi Jual Beli Pisang pada Usaha Kecil Menengah Kampung Cau Padjadjaran Jawa Barat," *Multinetics*, vol. 8, no. 2, pp. 131–140, 2022, doi: https://doi.org/10.32722/multinetics.v8i2.4674.

[19]   S. Sivakorn, I. Polakis, and A. D. Keromytis, "The cracked cookie jar: HTTP cookie hijacking and the exposure of private information," in *2016 IEEE Symposium on Security and Privacy (SP)*, IEEE, 2016, pp. 724–742.