

Financial Management Information System Design with Business Intelligence Approach

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Abstract

This research aims to design and develop a web-based financial management application for Pabrik Opak Sun Jaya Mandiri, utilizing a Business Intelligence (BI) approach. The study employs the Waterfall model within the System Development Life Cycle (SDLC) methodology, comprising stages such as requirements analysis, system design, coding, testing, and implementation. Data collection methods include observations, interviews, and literature studies. The application was developed using the PHP programming language and MySQL database, enabling automated financial recording and real-time reporting. The testing phase was conducted using Black Box Testing, which confirmed that all system functionalities operate as intended. The results demonstrate that the system significantly improves financial management by enhancing transaction accuracy, automating reporting, and providing insightful financial analysis through BI. This research contributes to the field of BI-based finance by demonstrating how BI can optimize decision-making for micro and small enterprises (MSEs). The integration of BI allows for a data-driven approach in analyzing income and expense trends, ultimately improving financial stability and business performance. Future research can expand system capabilities by incorporating machine learning for financial forecasting.

Keywords: Financial Management, Web-Based Application, Business Intelligence, Information Systems

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1. Introduction

The rapid development of information technology has had an impact on people's lives such as in the fields of economics, education, social and cultural fields, information and communication, and not to forget the business field. The business field is one of the many fields that are beneficial to society because of the existence of information systems [1]. This is because information systems are useful for society and can provide various things that we need to develop, most importantly in terms of easy and fast information delivery [2]. This condition led society to initially adapt aggressively to becoming proactive in seeking resources based on their needs and desires. In addition, with the enactment of Law Number 14 of 2008 concerning Openness of Public Information [3], [4].

Business Intelligence is a framework for changing information into data then processed to become learning materials, analyzed and become a basic decision-making company[5]. Business Intelligence helps companies in

breaking down information from various sources into tactical and strategic levels, can be used for the utilization of business analysis Business Intelligence is used as a procedure to combine a series of activities, also driven by the need for certain data from decision-making, Business Intelligence can be a competitive tool in analyzing companies. Business Intelligence provides benefits in improving the timeliness and quality of information.

Opak Sun Jaya Mandiri Factory is one of the MSMEs engaged in the business of making chips made from cassava. The Opak Kukus business is a home industry business engaged in the culinary field. This Opak Kukus business is a traditional snack made from cassava which is processed by grating cassava, forming it, steaming it, then drying it in the sun until it is finally ready to be distributed in the form of ready-to-process products and ready-to-eat fried opak products. The role of potential business actors is not accompanied by good management in the factory. One of them is poor financial management. There are still many financial reports that

are very simple. In fact, relevant financial reports make factory finances more stable and effective. This is because financial reports play a role in providing information on the financial position of an entity which is used to analyze the performance of its finances. The limited knowledge and accounting skills possessed by the resources in the factory are one of the factors that have not been carried out in good financial management.

Previous research highlights the significant role of Business Intelligence in improving the performance of micro, small, and medium enterprises (MSMEs). A study conducted by Muhammad Wisnu Alfiasyah, Nyoman Switrayana, and Logi Mulawarrman in 2024 analyzed the impact of BI on MSMEs in Lombok. The findings confirm that BI plays a crucial role in enhancing MSME performance by providing access to more relevant data and in-depth analysis, enabling informed and strategic decision-making. However, challenges in implementing BI in MSMEs include limited resources, technical expertise, and inadequate IT infrastructure. Addressing these issues requires investment in employee training, selecting appropriate BI solutions, and fostering support from government and industry sectors. Another study by Syarli, Rosmawati Tamim, and Akhmad Qashlim in 2018 examined the design of a Business Intelligence system in the Mamasa District Health Office Warehouse. Their research demonstrated that BI is not only beneficial for businesses but also supports decision-making in health, government, and service sectors. The study emphasized that BI enhances information visualization through interactive graphics, making data more accessible and easier to analyze [6].

In addition, a study by Nia Marsela and Bambang Hermanto in 2022 focused on the implementation of BI for evaluating service quality at the Tulang Bawang Barat Regional General Hospital. Their research developed a BI system using Google Data Studio for data visualization, which revealed critical performance indicators such as BOR, BOT, TOI, NDR, and GDR. This study highlights how BI facilitates better decision-making in the healthcare sector. Several other studies emphasize the role of BI in financial management systems. Research by Ramanathan et al. (2017) explored how BI improves financial performance through predictive analytics, enabling businesses to anticipate market trends and adjust financial strategies accordingly. Similarly, a study by Chen et al. (2019) demonstrated how BI applications in accounting and financial reporting enhance accuracy and efficiency by automating data processing and visualization [7].

In conclusion, Business Intelligence plays a pivotal role in financial management, particularly for MSMEs. Its ability to process and analyze vast amounts of data enhances decision-making, improves financial reporting, and strengthens overall business performance. Addressing the challenges of BI implementation in

MSMEs requires strategic investments in technology, training, and supportive policies from relevant stakeholders.

2. Research Methods

2.1. Research Stages

At this stage, the research method used is the system development method used in the System Development Life Cycle (SDLC) by applying the Waterfall method. The waterfall model is a simple classic software development model with a linear system flow. The output from the previous stage is input for the next stage, meaning that each stage in this method is carried out sequentially and continuously [8]. In the waterfall framework development method, there are several stages, namely: requirements analysis, system design, coding, program testing, and program implementation [9].

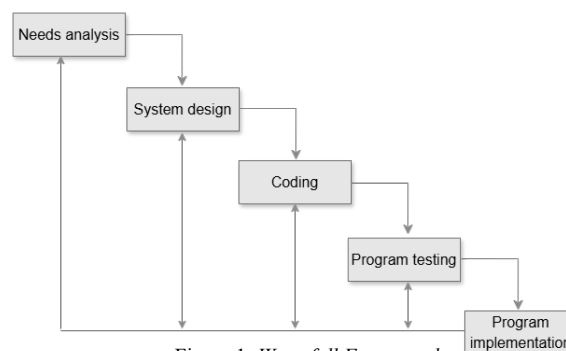


Figure 1. Waterfall Framework

1. Needs Analysis

At this stage, an analysis is carried out that includes two main activities, analysis of problems in the current system and analysis of needs for the new system to be developed. This analysis aims to identify weaknesses and deficiencies in the existing system, as well as determine the features and functionality needed in the new system in order to meet user needs more optimally [10].

2. System Design

System design is an activity to design an information system that will be built in detail based on the analysis activities that have been carried out, resulting in a proposed system design and accompanied by a database design and program specifications. Unified Modeling Language (UML) as a tool used in designing the system in this study. Unified Modeling Language (UML) is a visual language used to describe models in the form of communication about a system by relying on diagrams and supporting text. At this stage, the author creates a design model of the application to be

built using UML consisting of use cases, sequence diagrams, activity diagrams and class diagrams.

3. Coding

At this stage, the author translates the design results that have been made into a language that is understood by the computer. In creating the program, the author uses Android Studio with the Firebase database. Android Studio is the official Integrated Development Environment (IDE) for Android application development [11].

4. Program Testing

At this stage, the focus is on the software being tested to ensure that each element works according to the interface design using black box testing. The purpose of doing this is to minimize errors encountered during use.

5. Program Implementation

Program implementation is the final stage where the developer implements the application that has been completed and tested previously [12].

2.2. Data Collection Methods

The data collection methods used in this study consist of several techniques to ensure that the data obtained is accurate and relevant. The techniques include:

1. Observation

Observation is a systematic observation carried out through eye contact with the place/object of research. In this case, the author conducted direct observation at the Sun Jaya Mandiri Opak Factory.

2. Interview

The author conducted an interview with Indra as the owner of the Sun Jaya Mandiri Opak Factory, with the results of the interview being that the author obtained information related to the financial management process at the Sun Jaya Mandiri Opak Factory.

3. Literature Study

The technique for collecting data with literature study is by studying problems related to studying objects from textbooks, references according to experts and journals via the internet.

3. Results and Discussion

Use Case Diagram

Use case diagrams explain the relationship between users and systems, describing all interactions that users carry out with the web-based application that will be built. [13].

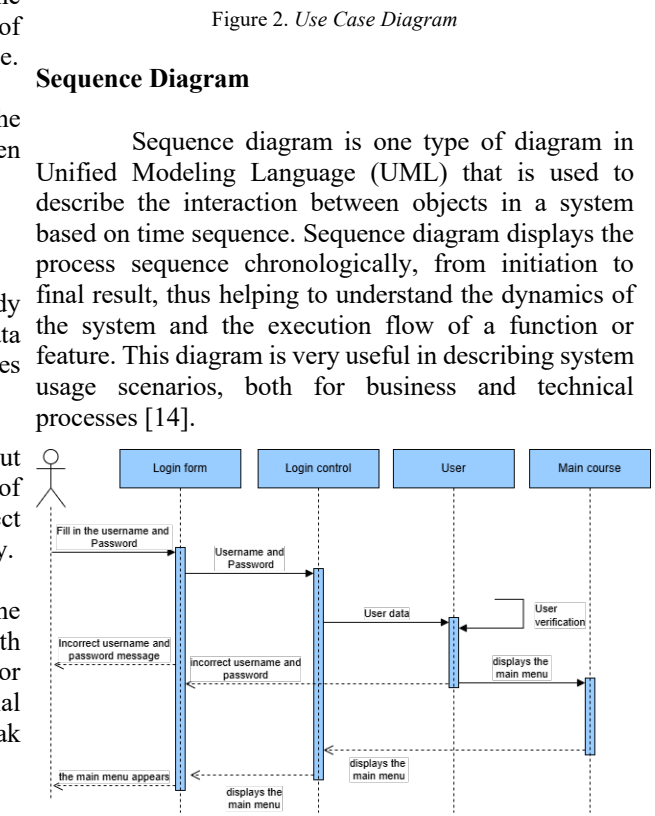
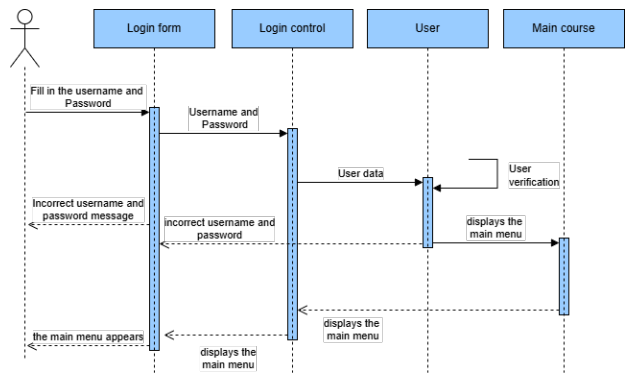


Figure 3. Sequence Diagram

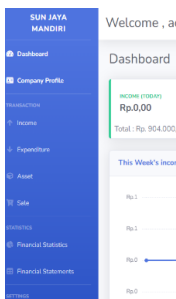
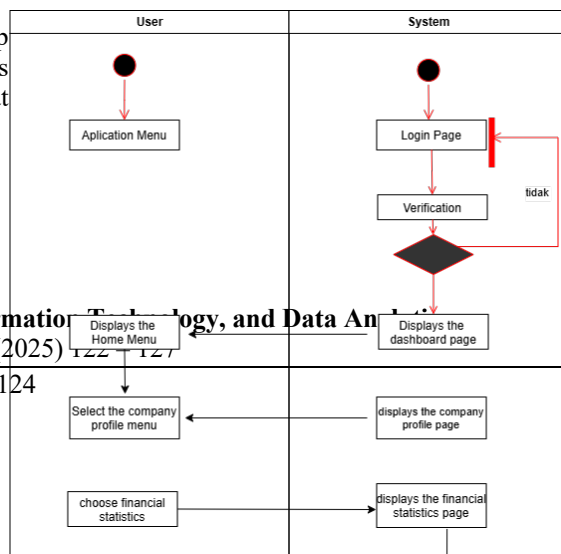
Sequence Diagram

Sequence diagram is one type of diagram in Unified Modeling Language (UML) that is used to describe the interaction between objects in a system based on time sequence. Sequence diagram displays the process sequence chronologically, from initiation to final result, thus helping to understand the dynamics of the system and the execution flow of a function or feature. This diagram is very useful in describing system usage scenarios, both for business and technical processes [14].



Activity Diagram

Activity Diagram is a diagram that provides an overview of the activities or actions that can be carried out by the system when explaining the functions described by the user [15].



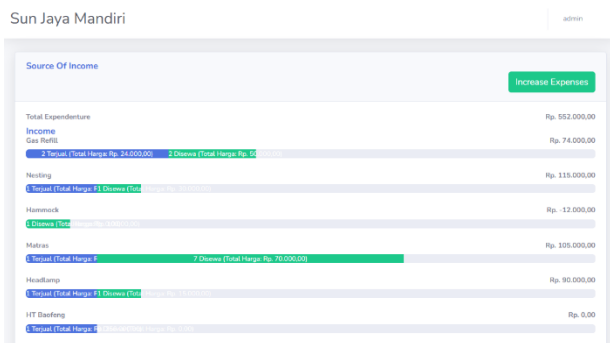


Figure 4. Activity Diagram

Implementation



Figure 5. Login Page

At this stage, the results of the system design in the form of a web-based application are implemented with features designed to meet user needs. This application includes various modules such as rental management, equipment stock management, and financial transaction recording. In addition, the system is equipped with a dashboard that displays financial reports automatically and in real time, making it easier for business owners to monitor income, expenses, and business profitability.

Figure 6. Dashboard Page View

The main display on the application is the login page, on this page the user will enter the email and password that have been registered as employees in the company. After logging in, the application display will display a dashboard by displaying several summaries of income (day), expenses (day), remainder, products, income this week, and income statistics.

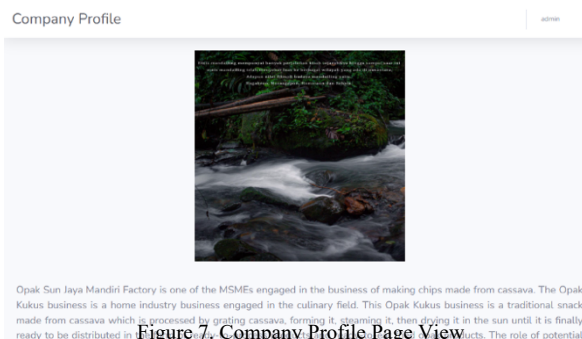


Figure 7. Company Profile Page View

In the application there is a company profile page, where the page explains the company profile in detail.



Figure 8. Revenue Page View

Next, there is a transaction that displays the income page, on the page it will present a display and recapitulation of income sources, namely income from sales and income from equipment rental.

In this view, company statistics will display the targets to be achieved by the company within a period of one month and will display the achievement of sales and rental of goods in monthly targets.

Figure 9. Display Of the Expenditure Page

Next, on the transaction page, it also displays the expenditure page made by the company, we will be directed to the add expenditure menu from the tool products that have been provided.

Figure 10. Assets Page View

On this page, the company's products will be displayed which are still in stock and have been sold or rented with the number of remaining items in the company.

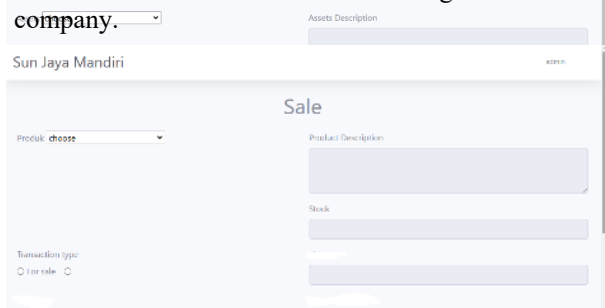


Figure 11. Sales Page View

Next, on the sales and rental page, you will be directed to the sales and rental form where on this display, the admin must select the products available in the company and select the type of transaction to be carried out. then also on this page the admin selects the type of transaction between sales and rental.

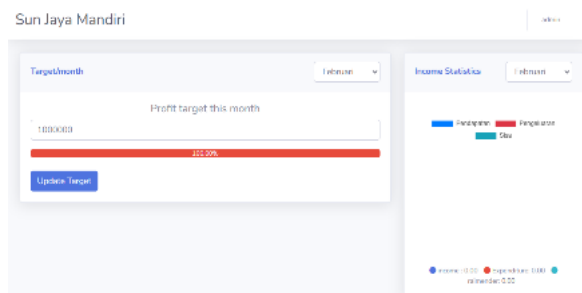


Figure 12. Financial Statistics Page View

Figure 13. Financial Report Page View

Next, this display will show the financial reports that occurred in the company in one month.

4. Conclusion

This study shows that the development of a web-based financial management application for the Sun Jaya Mandiri Opak Factory has successfully resolved various problems previously faced, especially in terms of financial management and transaction recording. Before this application, the financial management process was carried out manually, which caused many difficulties in monitoring income and expenses in real time, lack of regularity in recording transactions, and difficulties in creating timely and accurate financial reports. Other problems faced were the lack of visibility into cash flow and the susceptibility of the manual process to recording errors, which hindered business owners from making the right decisions regarding financial management. Through the implementation of this application, the process of recording transactions such as camping equipment rentals, sales, and stock management becomes more structured and automatic.

This application is able to generate financial reports automatically and present financial data in real time, so that business owners can easily monitor the company's financial condition more accurately and efficiently. In

addition, this application is equipped with a Business Intelligence (BI) feature that makes it easier for business owners to analyze income and expense trends, provide deeper insights into the financial performance of the business, and assist in decision making based on valid data. Employees also get convenience in doing their jobs, especially in terms of compiling reports and monitoring business developments. The application also successfully reduces reliance on manual processes that were previously time-consuming and potentially error-prone, while increasing overall operational efficiency and effectiveness. However, to maintain optimal application performance, periodic system evaluation and the addition of new features are essential in the future. Thus, this application is not only an effective solution in overcoming current financial management problems, but also has the potential to continue to grow and provide long-term benefits for the Explore Outdoor Panyabungan business.

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