

DESIGN OF FINANCIAL RECORDING SYSTEM USING WATERFALL METHOD AT ARTHO FURNITURE STORE

Raka Dwi Purnomo, Setiawan Ardi Wijaya, Silvia Mardiyanto

Department of Information Systems, University of Muhammadiyah Riau
Jl. Tuanku Tambusai, Delima, Kec. Tampan, Kota Pekanbaru, Indonesia
230402028@student.umri.ac.id

ABSTRACT

This research aims to develop a financial recording system for Artho Furniture using the Waterfall method based on the needs that have been identified. The results show that the system successfully automates transaction recording, reduces manual errors by 80%, and produces clear and accurate financial reports. The test results showed improved efficiency, transparency, and accountability in financial management, enabling shop owners to make better business decisions. With accurate and timely financial data, operational activities run more effectively. The system was developed using PHP and MySQL, with a user-friendly interface to facilitate users in daily operations.

Keywords : Financial Recording, Furniture Store, Information System, PHP, Waterfall Method.

1. INTRODUCTION

In the business world, effective and systematic financial record-keeping is a key factor in maintaining stability and business growth. Proper financial recording allows business owners to monitor cash flow, evaluate financial performance, and make strategic decisions based on accurate data. Without a good financial recording system, businesses may struggle to manage income and expenses, ultimately hindering their growth[1].

Artho Furniture Store, which has been engaged in the furniture industry since 2010 in Pekanbaru, faces challenges in financial record-keeping. One of the main issues encountered is the imbalance between revenue and production costs, causing the business owner to experience financial losses. Irregular transaction recording is one of the primary reasons for difficulties in controlling cash flow and accurately calculating profits. Therefore, a structured and efficient financial recording system is needed to document all transactions properly, assist in financial planning, and support sustainable business growth[2].

As a solution to this issue, a web-based financial recording system is designed using the waterfall software development methodology. This method includes systematic stages such as requirement analysis, system design, implementation, testing, and maintenance. The system will be developed using the PHP programming language combined with HTML and managed through phpMyAdmin for MySQL database administration. With this approach, financial transaction recording is expected to become more organized, transparent, and efficient in store operations[3].

This study aims to automate financial transaction recording, generate more accurate financial reports, and improve financial efficiency and transparency at Artho Furniture Store. Previous research has shown that implementing the waterfall method in financial information system development can enhance business

performance and facilitate more accurate financial management. It is hoped that this system will assist store owners in managing finances more effectively, minimizing errors, and supporting sustainable business growth[4].

2. LITERATURE REVIEW

The system is a form of unity that combines various components, where each component has various different objectives according to the problems that occur in a system[5].

Waterfall is an approach in software development that is commonly used for the development of a system. According to Sommerville, the Waterfall method is linear, starting from the initial stage of system development, the planning stage, to the final stage of system maintenance. Each stage must be completed before proceeding to the next stage, and it is not possible to repeat the stages that have been passed[6].

Financial recording is the daily, monthly and weekly recording of a business's financial reporting, the financial recording report serves as a guide for monitoring the business situation[7].

Planning is the process of determining the actions to be taken. In planning, there are a series of objectives, selection of methods, and certain procedures that are applied in activities according to the daily schedule[8].

3. RESEARCH METHODOLOGY

3.1. System Development Stage

The development of this system aims to facilitate financial recording and data collection at Artho Furniture stores. Data is collected through direct interviews and literature studies related to the store's financial recording process. In developing this software, the waterfall method is used which provides a structured approach and is commonly used in simple system development projects[9]. The waterfall software development flow is depicted in figure 1.

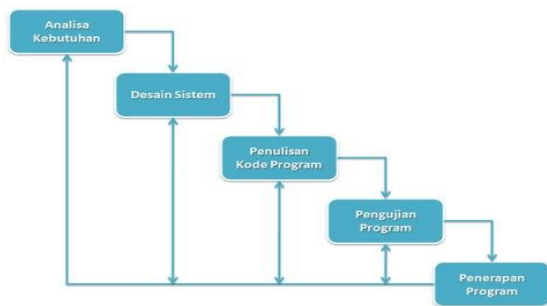


Figure 1. Waterfall method

- a. Needs Analysis: The needs analysis is carried out to find out the needs in designing the system and determine the solution to the existing problems both from the admin and owner's side. Data collected in the form of problems encountered and documents related to financial records in the storeUse lowercase letters and abjed for list numbering.
- b. System Design: The previously identified system requirements are then designed in the form of design representations with the main objective of ensuring that all aspects required in building the system have been taken into account and carefully designed before stepping into the coding stage. The design designed at this stage includes usecase, activity, sequence, class diagrams and interface design of the system[10]. Usecase Diagram memvisualisasikan interaksi antara fungsi dan fitur yang ada dengan aktor-aktor yang terlibat dalam sistem[11]. Activity Diagrams provide an overview of the series of activities carried out in the system. Activity Diagrams help in understanding the sequence of actions that must be performed and show how these activities are interrelated[12]. Sequence Diagrams provide a detailed description of the interactions between objects that exist in the system sequentially. This diagram serves as a communication map between objects in terms of the sequence of messages sent between them[13]. Class Diagram provides an overview of the classes that will make up the system, as well as the behavior and responsibilities of each entity that exists[14]. Class Diagram shows the class structure, attributes, objects, relationships between classes, and functions owned by each class. Interface Design is a form of graphic display that is a design representation in the form of visualization of the features needed by users. This design includes layout, visual components, navigation between pages, and interactive elements that will exist in the application or system.
- c. Program Code Writing: This stage implements the designs that have been made previously into the form of program code with the implementation of the PHP programming language which is quite popular in system development and phpMyAdmin

as a database that will accommodate all financial records data.

- d. Program Testing: Testing is done to ensure that the designed software is in accordance with the wishes of the customer and to ensure that there are no errors in the system[15]. Testing will be carried out using black-box testing and white-box testing methods. Black-box testing is done by identifying errors in the system and fixing bugs in the application[16]. In White Box Testing the testers need to study the program code in detail.
- e. Program Implementation: After testing is done and ensuring that no errors are found in the system, the next step is to implement the program into the production environment of the Artho Furniture store. This implementation includes installing the system, moving data from the old system if needed, and training employees to use the new system. The main objective of the implementation stage is to ensure that the financial recording information system functions smoothly and effectively according to the needs of Toko Mabel.

4. RESULT AND DISCUSSION

4.1. Analysis

- a. Hardware Requirements: The system requires an Intel® Core™ i5-12450H processor with 12MB cache and speeds up to 4.40GHz, 8 GB of RAM, and 477 GB of SSD storage space .
- b. Software requirements: this system requires Windows 11 Operating System, Visual Studio Code (VS Code) code editor, XAMPP server software, MySQL database, and Google browser.

4.2. Design

- a. Design Use Case diagram: In Figure 2 below is the use case diagram design of the financial recording system.

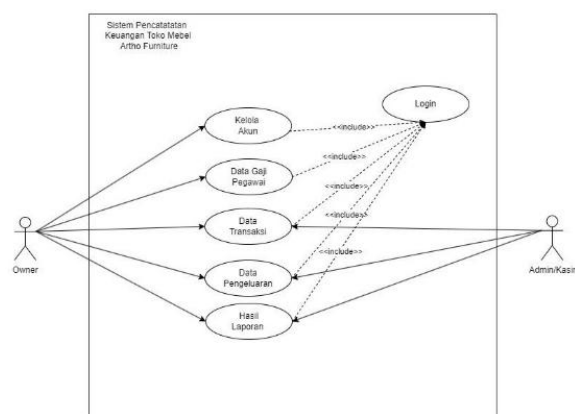


Figure 2. Use Case Diagram

In the Use Case displayed in Figure 2 above explains the financial recording system where the admin / cashier is tasked with recording transaction data, expense data, and report results from transaction data, employee salary data, and

expense data, while the Owner can access all menus in the system to monitor how the performance of the cashier according to accurate data

- b. Activity diagram design: The design of the Transaction data Activity Diagram is shown in Figure 3 below.

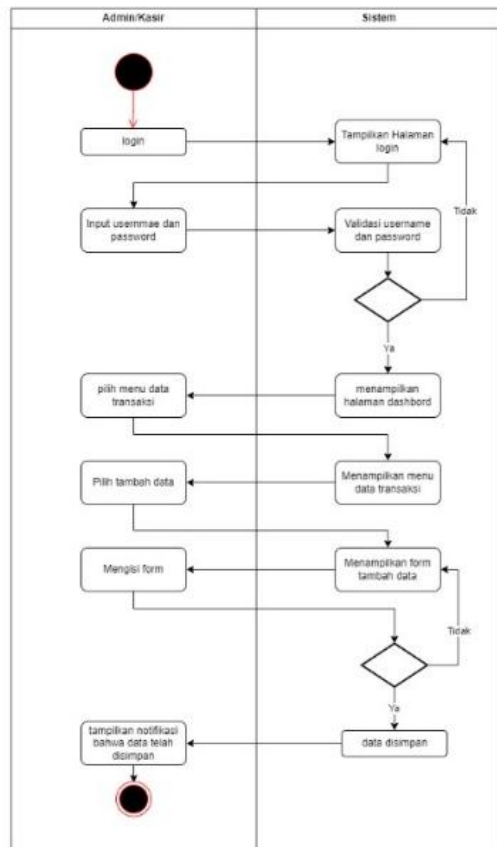


Figure 3. Transaction Activity Diagram

The activity diagram shown in Figure 3 above shows the process carried out by the admin / cashier to manage transaction data in the system described in this activity diagram. This process starts with logging in, verifying username and password, selecting the transaction data menu, adding new transaction data, filling out forms, and verifying the data that has been inputted. If the data is correct, the system saves it and notifies that the data has been saved. During the process of managing transaction data, each step is carried out clearly and structurally, as shown by this diagram.

- c. Activity diagram design: The design of the Activity Diagram of Expenditure data is shown in Figure 4 below.

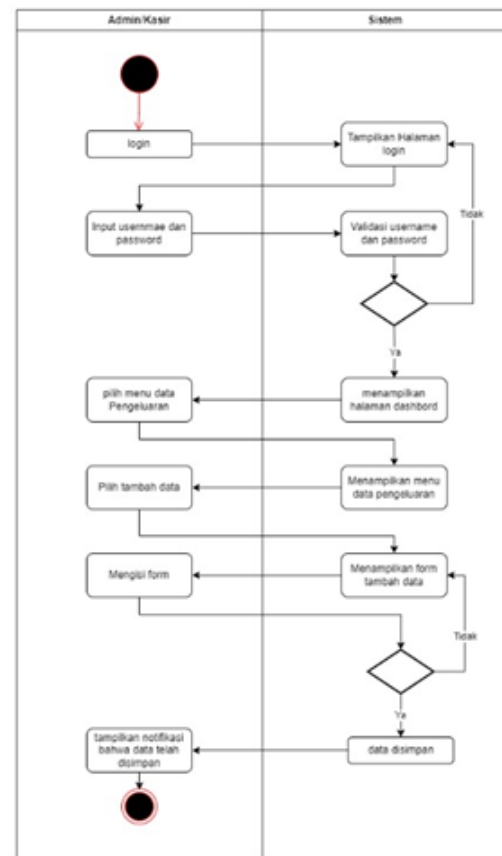


Figure 4. Activity Diagram of Expenses

The Activity diagram shown in Figure 4 above shows the admin/cashier workflow used to manage expense data through the system. First, the admin/cashier inputs a combination of username and password which will be validated by the system. After successful validation, the system displays a dashboard page where the admin/cashier can select the expense data menu and the option to add data. After inputting the expense data, the system verifies the filled data if it is correct, and displays a notification that the data has been saved. This process ensures that expense data management is done in a clear and organized manner.

- d. Sequence diagram design: The Sequence Diagram design of transaction data is shown in figure 5 below.

In Figure 5, the cashier starts the process by logging into the system. After a successful login, the cashier accesses the page containing the transaction menu. The cashier then clicks the "Add Data" button on the transaction menu page, and the system displays the add data form on the expense page. The cashier fills in the form with the data to be added, then sends the data to the system. Next, the system performs a validation process to ensure that the data submitted matches the one in the database. If the validation is successful, the data is

added to the system, and the cashier receives a confirmation that the data was successfully added.

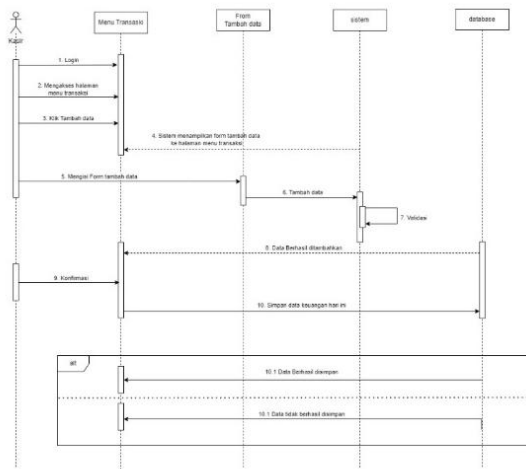


Figure 5. Transaction Sequence Diagram

- e. Sequence diagram design: The design of the Sequence Diagram of expense data is shown in Figure 6 below.

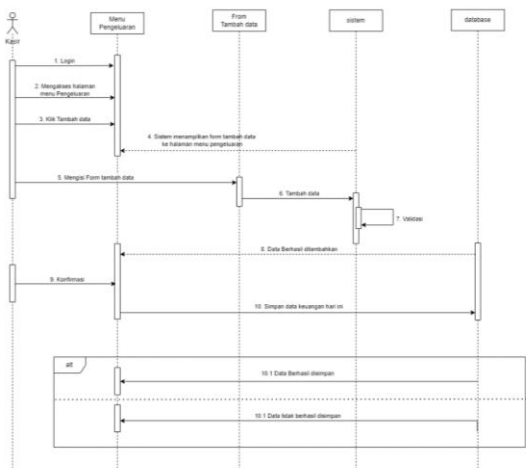


Figure 6. Expenditure Sequence Diagram

In Figure 6 above, the cashier starts the process by logging into the system. After a successful login, the cashier accesses the expense menu page. The cashier then clicks the “Add Data” button on the transaction menu page, so that the system displays the add data form on the expense menu page. The cashier fills in the form with the data they want to add and sends the data to the system. The system then validates the submitted data. If the validation is successful, the data is added to the system, and the system provides confirmation to the cashier that the data has been successfully added and stored in the database.

- f. Class Diagram Design: The class diagram design illustrates the structure by defining the classes, attributes and functions and relationships of each

class in the financial recording system shown in Figure 7 below.

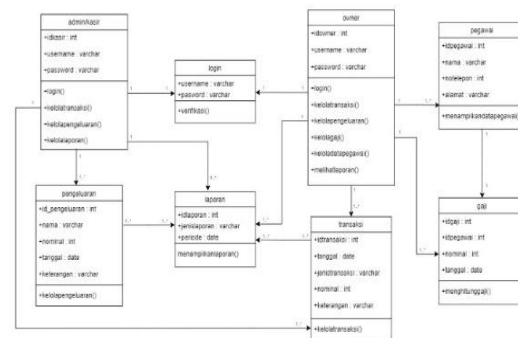


Figure 7. Class Diagram

In Figure 7 above there are several tables including the admin / cashier table which has a one to one relationship with the login table because each admin has a unique username and password combination. Another case with expenses that have a one to many relationship because one admin can record several expenses, as well as one to one and one to many relationships between the admin and owner tables with other tables. It can be seen that only the owner table has a relationship with the employee table and salary table with a one to many relationship, which means that an owner can access various employee data and employee salaries. In the admin table there is a manage report function which means that the admin / cashier is tasked with managing reports while the owner table has a view report function which means that the owner is only tasked with viewing reports that have been created by the admin.

- g. Login Interfaces Design: The Login Interfaces design depicts the beginning of the financial record website before going to the next page, shown in figure 8 below.



Figure 8. Login Interfaces Design

In Figure 8 above the owner is asked to enter the username and password that they have registered previously. If the username and password entered are valid, the system will provide access to the next page. However, if the username or password

entered is invalid with the one previously registered, the system will give a “failed login” message, which aims to inform the admin that the data entered is invalid, so they cannot access the next page.

- h. Dashboard Interfaces Design: The Dashboard Interfaces design depicts the owner when logged in, shown in Figure 9 below.



Figure 9. Dashboard Interfaces Design

In Figure 9 above the owner's dashboard can see some brief summaries of transaction data and report results on artho furniture stores.

- i. Salary Data Interfaces Design: Salary Data Interfaces design the owner can view the salary data of all employees as shown in figure 10 below.

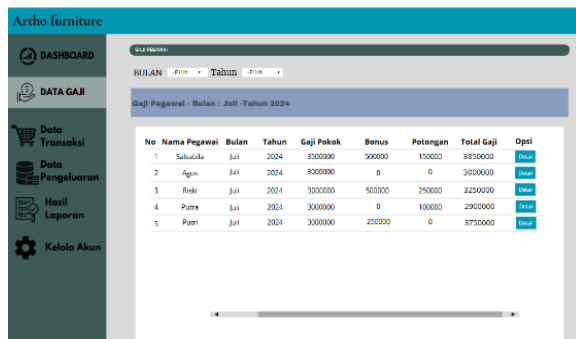


Figure 10. Design of Salary Data Interfaces

In Figure 10 above, the owner can manage employee salary data more efficiently. This page offers features to manage salary data and can search and filter based on various criteria, such as employee name, base salary, payment period. With these features, this page ensures that the payroll process is carried out accurately and on time and provides transparency and convenience in the financial management of artho furniture stores.

- j. Transaction Data Interfaces Design: Transaction Data Interfaces Design The owner can view transaction data at artho furniture store as shown in Figure 11 below.

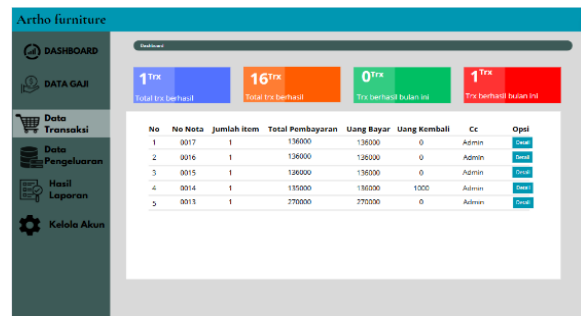


Figure 11. Design of Transaction Data Interfaces

In Figure 11 above all transactions in the store can be monitored by the owner. This page allows the owner to view transaction history, as well as search and filter based on criteria such as receipt number, number of items, or total payment.

- k. Expenditure Data Interfaces Design: Spending Data Interfaces Design The owner can view spending data on artho furniture stores as shown in Figure 12 below.

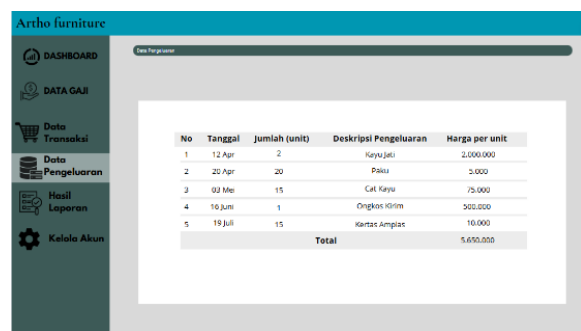


Figure 12. Design of Expenditure Data Interfaces

In Figure 12 above, expenses at the store can be monitored by the owner. This page has a search and filter by expense category, date, or number of units.

- l. Design Interfaces Report results: Design Interfaces The owner can see the results of the report on the artho furniture store which can be seen in Figure 13 below.



Figure 13. Design of Report Results Interfaces

Figure 13 above provides owners with easy access to important financial reports. The owner can view, and download financial reports on this page.

- m. Manage account Interfaces Design: Design Interfaces Manage account owner can manage existing accounts at artho furniture store as shown in Figure 14 below.

Figure 14 above has the function of managing and monitoring all user accounts that have access to the financial system. This page allows to add, edit, or delete accounts, as well as set the access level and privileges of each user. Thus, the owner can ensure that only the owner himself and trusted people can access the data, improve data security, and maintain the integrity and confidentiality of financial information.

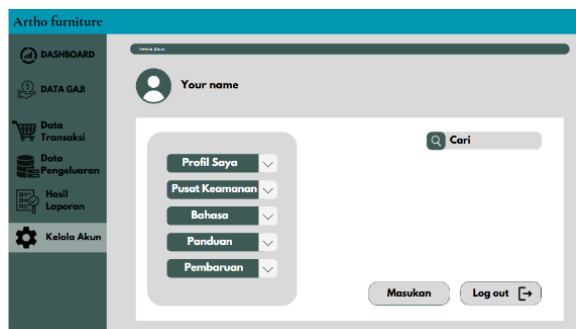


Figure 14. Design of Manage Account Interfaces

- n. Design of Cashier Transaction Data Interfaces: The Transaction Data Interfaces design of the admin section can view and manage overall transaction data at the artho furniture store as shown in Figure 15 below.

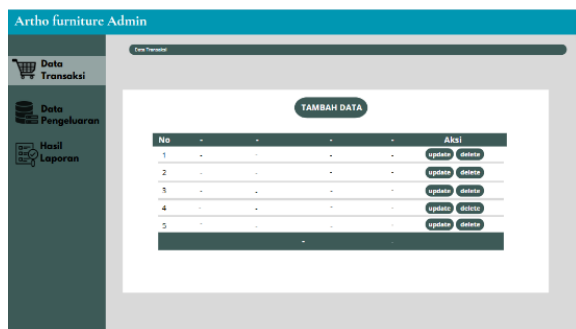


Figure 15. Design of Cashier Transaction Interfaces

can be monitored, recorded, and managed directly by the cashier. This page has features to view transaction history, add new transactions, and search and filter based on criteria such as receipt number, number of items, or total payment. These features help ensure accurate financial records and support accurate and thorough financial reporting.

- o. Design of Cashier Expenditure Data Interfaces: The Cashier's Expense Data Interfaces design can view data and manage overall expenses at artho furniture stores as shown in Figure 16 below.

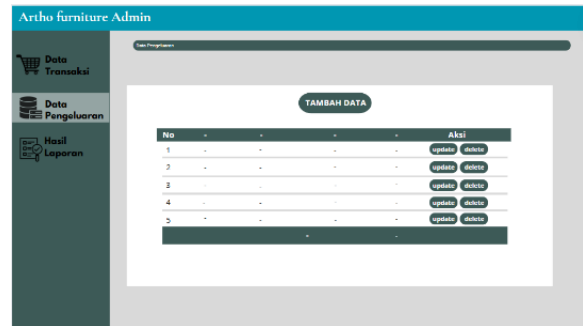


Figure 16. Design of Cashier Expenditure Data Interfaces

In Figure 16 above all store expenses can be monitored and managed thoroughly by the cashier. This page has a feature to record expense data. With these features, this page helps in cost control, ensures that all expenses are recorded accurately, and simplifies the audit process and creates clear and timely financial reports.

- p. Design of Cashier Report Results Interfaces: Design Interfaces of the cashier section can view and manage the overall report results at the artho furniture store seen in the following figure 17.

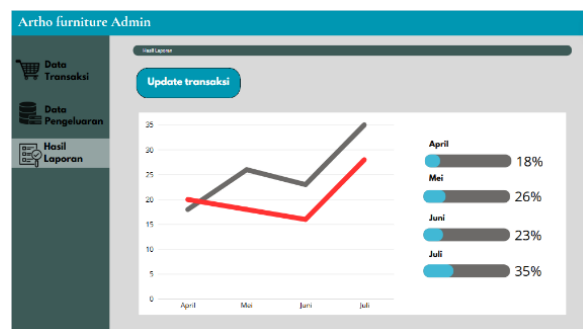


Figure 17. Design of Cashier Report Results Interfaces

In Figure 17 above this page provides easy access for cashiers to various important financial reports. cashiers can view, manage and download financial reports on this page. Cashiers can generate reports by time period, This helps financial performance analysis, more flexible decision making.

4.3. Program Code Writing

At this stage, the designs that have been made previously are implemented into the form of program code. Implementation is done using the PHP programming language, which is very popular in system development due to its flexible and efficient capabilities. PHP allows the creation of dynamic and interactive web applications, which are very suitable for financial recording systems. In addition, phpMyAdmin is used as a MySQL database management tool to house all financial record data. phpMyAdmin provides an easy-to-use interface for database administration, allowing for efficient and

structured data management. By using a combination of PHP and phpMyAdmin, the developed financial recording system is expected to run well, fulfill the needs of Artho Furniture furniture store, and assist the owner in managing store finances more effectively and accurately.

4.4. Program Testing

Testing is done to ensure that the software designed is in accordance with the needs and desires of the customer as well as to ensure there are no errors in the system. In the context of developing a financial recording system for Artho Furniture furniture store, testing is done through two main methods, namely black-box testing and white-box testing. Black-box testing is done by focusing on identifying errors in the system without looking into the code structure, aiming to find bugs and fix problems in the application. This test helps ensure that all system functions run according to the expected specifications and can handle various usage scenarios by end users. White-box testing, on the other hand, involves an in-depth examination of the program code by testers. They need to study the code in detail to ensure that the programming logic runs correctly, the flow control structure is appropriate, and there are no loopholes that could lead to system failure. Through the combination of these two testing methods, it is expected that the developed financial recording system can function optimally, free from errors, and provide reliable performance for users at Artho Furniture furniture store.

4.5. Blackbox Testing Scenario

Blackbox testing will be carried out by testing each main feature in the system based on the expected input and output. The following are some of the test scenarios designed:

Table 1. Blackbox Testing Scenario

Features Tested	Testing Steps	Expected Results
Login	Enter a valid username and password.	The system successfully validates and displays the dashboard page.
Input transaction data	Fill in the form to add transaction data.	The data is saved successfully and a notification appears that the data has been saved.
Input expense data	Fill in the form to add transaction data.	The data is saved successfully and a notification appears that the data has been saved.

4.6. User test scenario

Since the system is still under development, a user testing plan has been developed to ensure that once implemented the system can be used as expected.

Table 2. User Test Scenario

Scenario	Description	Expected Results
Transaction Recording	Users record sales and purchase transactions through the system by filling in the required data.	Transaction data is stored accurately and financial reports are updated automatically.
Preparation of financial reports	Users access financial statements based on a specific period selected.	Financial reports are displayed completely and according to the transaction data that has been stored.
User Management	Admin adds, edits, or deletes user accounts in the system as needed.	User data is updated correctly and the system remains stable.
System Usage on Mobile and Desktop	Users try to access the system through different devices, such as computers, smartphones, etc.	The system display remains responsive and functional across devices.

4.7. Program Implementation

After testing is completed and ensuring that no errors are found, the next step is to implement the system in the production environment of Artho Furniture Shop. This implementation includes installing the system on the store's servers and hardware, as well as migrating data from the old system if needed to ensure the availability of historical data. Additionally, employee training is conducted to equip them with the necessary skills to operate the system, manage data, and generate financial reports effectively. This training helps employees quickly adapt and utilize the system to support daily operations.

5. CONCLUSION

This research develops a financial recording system for Artho Furniture Shop using the Waterfall method. The system automates transaction recording, generates accurate financial reports, and minimizes manual errors. Built with PHP and MySQL, it features a user-friendly interface to enhance decision-making, efficiency, and transparency. Development stages include requirements analysis, system design, coding, testing, and implementation. Testing confirms the system functions as expected, improving daily operations. Overall, it enhances financial management, reduces errors, and supports business growth.

REFERENCES

- [1] N. Rizqya, "Perancangan Sistem Informasi Akuntansi Laporan Posisi Keuangan Pada UMKM Berbasis WEB (Studi Kasus UMKM Home Catering)," *Jurnal Ilmiah Komputasi*, vol.

- 19, no. 3, Sep. 2020, doi: 10.32409/jikstik.19.3.65.
- [2] A. Sopiyan and R. A. Darajatun, "ANALISIS SITUASIONAL DAN PERANCANGAN SISTEM INFORMASI KEUANGAN PADA PT ZMI," *Jurnal Informatika dan Teknik Elektro Terapan*, vol. 12, no. 1, Jan. 2024, doi: 10.23960/jitet.v12i1.3753.
- [3] SYIFA. VIDYA SOFWAN, "PENERAPAN METODE PENCATATAN PERSEDIAAN OBAT DI PUSKESMAS CIPEDES," *Jurnal Ilmiah Akuntansi*, 2020.
- [4] J. Penerapan Teknologi Informasi dan Komunikasi, D. Putri Rahmatika, and S. Winarso Martyas Edi, "IT-EXPLORE PENGEMBANGAN SISTEM INFORMASI KEUANGAN BERBASIS WEB UNTUK BENDAHARA DUSUN SIDAWUNG," 2022.
- [5] A. Sucipto, "SISTEM INFORMASI PENJUALAN OLEH SALES MARKETING PADA PT ERLANGGA MAHAMERU," 2020. [Online]. Available: <http://jim.teknokrat.ac.id/index.php/sisteminformasi>
- [6] V. Adi Kurniyanti and D. Murdiani, "Perbandingan Model Waterfall Dengan Prototype Pada Pengembangan System Informasi Berbasis Website," *Jurnal Syntax Fusion*, vol. 2, no. 08, pp. 669–675, Aug. 2022, doi: 10.54543/fusion.v2i08.210.
- [7] I. K. Dewi, M. Yovita, and R. Pandin, "PENINGKATAN KINERJA UMKM MELALUI PENGELOLAAN KEUANGAN".
- [8] W. Kurniawati, "DESAIN PERENCANAAN PEMBELAJARAN," 2021.
- [9] R. Hafsari, R. Rahmadani Saputra, and M. Afir Widyansah, "Perancangan Absensi Berbasis Web Dengan Metode Waterfall (Studi Kasus: PT. GlobalRiau Data Solusi)," *Jurnal Computer Science and Information Technology* (CoSciTech), vol. 4, no. 1, pp. 306–312, 2023, doi: 10.37859/coscitech.v4i1.5400.
- [10] A. L. Kalua, "Penerapan Extreme Programming Pada Sistem Informasi Keuangan Sekolah Berbasis Website," *Jurnal Ilmiah Informatika dan Ilmu Komputer (JIMA-ILKOM)*, vol. 1, no. 2, pp. 69–76, Sep. 2022, doi: 10.58602/jima-ilkom.v1i2.10.
- [11] L. Setiyani, "Implementasi Cybersecurity pada Operasional Organisasi," 2021.
- [12] W. Aliman, "Perancangan Perangkat Lunak untuk Menggambar Diagram Berbasis Android," *Syntax Literate ; Jurnal Ilmiah Indonesia*, vol. 6, no. 6, p. 3091, Jun. 2021, doi: 10.36418/syntax-literate.v6i6.1404.
- [13] Suendri, "Implementasi Diagram UML (Unified Modelling Language) Pada Perancangan Sistem Informasi Remunerasi Dosen Dengan Database Oracle (Studi Kasus: UIN Sumatera Utara Medan)," *ALGORITMA: Jurnal Ilmu Komputer dan Informatika*, p. 1, 2018, [Online]. Available: <http://www.omg.org>
- [14] I. Kadek *et al.*, "Sistem Informasi Keuangan Pada Perusahaan Kost Elit Dengan Metode Waterfall," *JURNAL SWABUMI*, vol. 9, no. 2, 2021.
- [15] S. Supiyandi, M. Zen, C. Rizal, and M. Eka, "Perancangan Sistem Informasi Desa Tomuan Holbung Menggunakan Metode Waterfall," *JURIKOM (Jurnal Riset Komputer)*, vol. 9, no. 2, p. 274, Apr. 2022, doi: 10.30865/jurikom.v9i2.3986.
- [16] M. Nur Ichsanudin, M. Yusuf, S. Jurusan Rekayasa Sistem Komputer, J. Teknik Industri, I. AKPRIND Yogyakarta, and R. Artikel, "PENGUJIAN FUNGSIONAL PERANGKAT LUNAK SISTEM INFORMASI PERPUSTAKAAN DENGAN METODE BLACK BOX TESTING BAGI PEMULA INFO ARTIKEL ABSTRAK," vol. 1, no. 2, pp. 1–8, 2022, doi: 10.55123