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Analysis and Design of PT KDA Langling Cooperative System Through Web-based Savings and Loan Transformation Technology

Ade Agung Kurniawan[1], Widja Yanto[2], Dafit Afianto[3]
adeagungkurniawan@dosen.ummuba.ac.id[1], agungwidjaya09@gmail.com[2], dafit.global@gmail.com[3]
[13] Information Technology Study Program, Universitas Muhammadiyah Muara Bungo, Jambi, Indonesia
[2] Information Technology Study Program, Universitas Merangin, Jambi, Indonesia

ABSTRACT

PT KDA Langling Cooperative, as an economic enterprise dedicated to the interests of villagers and employees, is located in Langling Village RT 15, PT KDA Langling Sinarmas Housing. In order to manage savings and loans, the current system faces significant obstacles because it has not used computer technology. Recording is still done manually in books, causing delays in data collection and the potential for loss or damage to data in the archive. This research aims to analyze the current system, with a focus on fixing these problems. The solution is to design a web-based savings and loan information system that will optimize the efficiency and accuracy of data. The method that will be used by the author is literature review, data collection and using the waterfall model with the stages of the process of analyzing needs, design, implementation, testing and maintenance, using the PHP programming language and MySQL DBMS, UML and Usecase diagram. So that this research produces an integrated system that provides convenience for users in savings and loan activities and presents web-based financial information.

Keywords: Savings and Loan; Web Tech Finance; Information System

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Correspondence Author:

Ade Agung Kurniawan,
Information Technology Study Program,
Universitas Muhammadiyah Muara Bungo, Jambi, Indonesia
Email: adeagungkurniawan@dosen.ummuba.ac.id

1. INTRODUCTION

The development of the internet has revolutionized the way cooperatives operate, enabling them to become more efficient, transparent, and accessible. By adopting internet technologies, cooperatives can streamline their operations, enhance member engagement, and expand their reach to new markets. One of the key benefits of internet adoption is the ability to move from traditional paper-based information management to computerized systems [1]. This shift enables cooperatives to store and retrieve data more easily, generate reports and analysis, and improve overall decision-making. Additionally, internet-based platforms provide cooperatives with a cost-effective way to reach a wider audience, promote their services, and attract new members. For instance, savings and loan cooperatives in rural areas can leverage online platforms to connect with potential borrowers and depositors, expanding their financial reach and supporting local economic development. A computer is a tool used to process data according to procedures that have been formulated by the existing system [2].

Conventional cooperatives may face various risks, including Operational risk. Errors and inefficiencies in operational processes can lead to financial losses for the cooperative. Reputation risk lack of transparency can lead to mistrust from members and other stakeholders, which can negatively impact the

cooperative's reputation. Competition risk Inefficient and unaffordable cooperatives will find it difficult to compete with other financial institutions, such as banks and fintechs.

The most up-to-date knowledge and technology in the field of savings and loan technology is current best practices used by leading companies in certain industries using Blockchain, which can be used to make savings and loan payments quickly, safely, and efficiently, process automation. Blockchain can also be used to automate processes that involve multiple parties, such as the process of transferring funds between cooperative members [8].

PT KDA Langling Cooperative is an economic organization owned and operated for the benefit of rural residents and the environment of PT KDA Langling employees. In the current system, there are obstacles caused by not using a computer and only recording through recording in a book so that activities, especially data collection for savings and loans, become relatively long, where the author assesses the work system in the cooperative there are obstacles, namely slow administrative performance, data stored in archives is likely to be lost or damaged, in carrying out financial calculations the cooperative management only uses simple calculator calculations, if a calculator calculation is wrong, the management will reset to start calculating from the beginning again and in making reports the management is bothered to have to recap the previous data which is already very much, besides that for the loan application process must come to the location.

To improve the quality of the Cooperative and provide convenience for its members, the solution that the author offers is a web-based cooperative savings and loan information system with features that are in accordance with the needs, among others, member registration, loan applications, viewing loan history, and data processing by the admin.

In accordance with the problem identification and problem restrictions that have been stated in the discussion of the background of the problem above, the authors can put forward the formulation of the problem, namely Web Tech Finance: Improving Efficiency and Accessibility at PT KDA Langling Cooperative through Web-based Technology Savings and Loan System Transformation.

2. RESEARCH METHOD

This research adopts a proven effective software development methodology approach, the waterfall method. This method emphasizes linear and sequential stages of software development, from planning to testing, allowing for tight control over each stage of the development process. The decision to adopt the waterfall method was driven by the need to maintain the quality and integrity of the system, especially in the financial context at PT KDA Langling Cooperative.

Website development will be carried out by utilizing the PHP programming language and the MySQL database management system. PHP was chosen for its ability to generate dynamic web pages and its flexibility in integrating with MySQL databases, which is considered particularly suitable for complex financial web applications. This decision was based on considerations of reliability, speed, and good support for web application development.

The website development model follows the waterfall approach. The planning phase will precede the analysis phase, followed by design, implementation, testing, and maintenance. Each of these phases is interrelated and dependent on each other, providing a clear framework to achieve the goal of this research, which is to improve the efficiency and accessibility of the Savings and Loan system at PT KDA Langling Cooperative through web-based system transformation

2.1. Literature Review

A literature study is a meticulous and comprehensive exploration of scientific literature, encompassing various sources and methodologies. Through this process, researchers gain valuable insights, develop a solid theoretical framework, and situate their own research within the broader academic landscape, ultimately contributing to the advancement of knowledge in their respective field.

2.2. Waterfall Method

The Waterfall Method is one of the linear and sequential software development approaches or models. This model is also known as a sequential development model because it follows a series of sequential stages, similar to a waterfall flowing downward. This approach has fixed and structured steps, starting from the planning phase to the maintenance phase.

1. Planning: In this stage, the needs of the project and its scope are determined. Planning involves identifying resources, estimating time and cost, and determining a schedule.
2. Analysis (Requirements): System needs and requirements are identified and documented in detail. This involves intensive communication with stakeholders to ensure a good understanding.

3. Design: A detailed system design is carried out based on the previously established needs and requirements. The design involves modelling the system structure and its interface.
4. Implementation: This stage involves transforming the design into executable program code. The code is implemented according to the design specifications.
5. Testing: After implementation, the system is tested to ensure that it works as required and has no bugs or errors.
6. Maintenance: Once the application or system is implemented and tested, the maintenance phase ensures that the software continues to work as intended and can be adapted to meet changing needs.

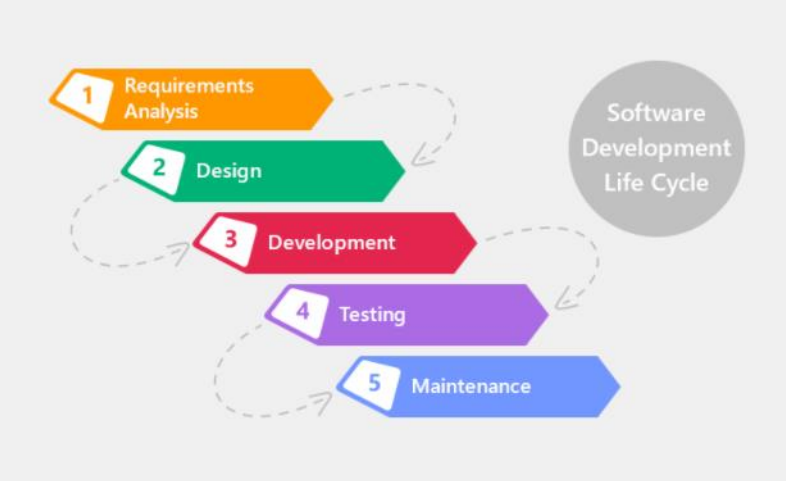

Fig 1. Waterfall Method SDLC

2.3. Data Collection

At this stage the author collects data using observation, interviews and direct documentation with the management of PT KDA Langling Cooperative, besides that the author also conducts observations, case studies, and documentation.

Surveys or Questionnaires:

1. Surveys involve collecting data from respondents through pre-designed questions. Questionnaires can be administered in writing or through interviews.
2. Interviews: Interviews involve direct interaction between researchers and respondents. This can be done face-to-face, over the phone, or through online media. Interviews provide an opportunity to get more in-depth information.
3. Observation: Observation involves direct observation of the events or behaviors to be studied. This can be done with or without the researcher's participation in the observed situation.
4. Case Study: Case studies involve in-depth analysis of a single case or selected cases. Data is collected through various sources, such as interviews, observations, and documents.

2.4. Data Analysis

At this stage the author analyzes the data that has been collected as an effort or way to process data into information so that the data can be understood and useful for problem solutions, especially problems related to research taking place at PT KDA Langling Cooperative.

3. RESULTS AND DISCUSSION

PT KDA Langling Cooperative is a cooperative that has great potential to grow. The cooperative has a strategic location, in a village populated by many people who need savings and loan services. It also has members who are active and committed to advancing the cooperative.

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However, the cooperative also faces some challenges, namely:

1. System that has not been computerized
2. Lack of experts
3. Digitize the system

The following are some of the technologies and concepts in the PHP ecosystem used to build the PT KDA Langling Cooperative savings and loan application. This system developed using the Laravel framework provides a good project structure, ORM (Eloquent), routing system, and many other features that facilitate the development of applications today. Then the author also added Laravel Passport which provides tools to implement OAuth2 API authentication. As well as JWT (JSON Web Tokens) JWT can be used to transmit authentication information as encrypted and authorized JSON objects.

The following is the calculation loan interest on PT KDA Langling cooperative:

(Loan amount/Length of loan) + (loan amount x 1.5% interest)

The conditions for becoming a member and borrowing savings and loans are:

1. Residing in the langling village area
2. Have paid the installment of principal savings as determined by the articles of association by the langling cooperative
3. Members are declared inactive after not making deposits for 3 months without explanation
4. Comply with the terms and conditions that apply

Sample Data:

Loan amount: Rp10,000,000
Loan period: 1 year (12 months)
Interest rate: 1.5% per year

Calculation:

Installments per month = (Loan amount / Loan period) + (Loan amount x Interest rate)
Installments per month = (Rp10,000,000 / 12 months) + (Rp10,000,000 x 1.5/100)
Installments per month = Rp833,333 + Rp150,000
Installments per month = Rp983,333

Result:

With these data, the monthly installment that must be paid is Rp983,333.

3.1. Ongoing System Analysis

Analyzing an ongoing system is one of the stages to analyze a system in accordance with the main purpose of the system itself, namely making it easier for users and admins. In this section the author describes the current system, among others, the registration of cooperative members where to save the community or prospective cooperative members must be registered as cooperative members, as for the description of the current system to become a member of the cooperative is as follows

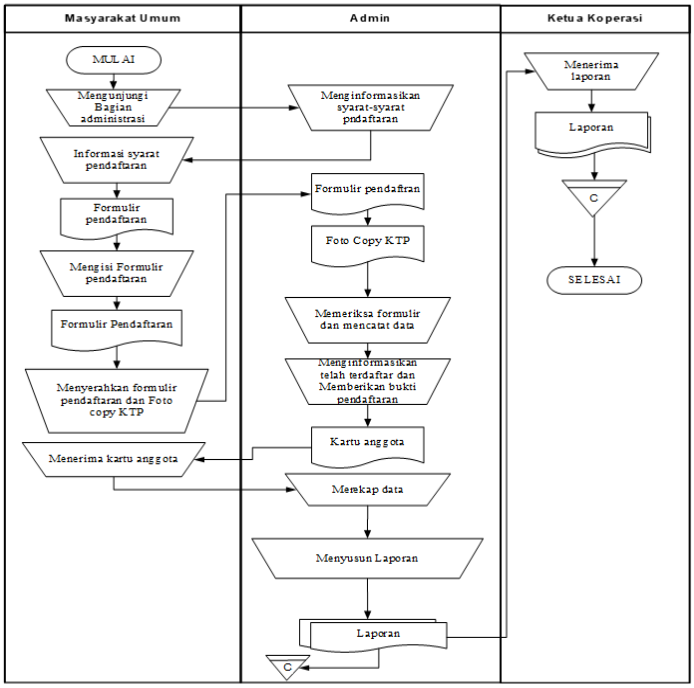

Fig 2. Registration Document Flow Chart

This flowchart describes the loan application process in the cooperative. This process starts with a cooperative member applying for a loan. The cooperative member then fills out a loan application form and submits it to the cooperative. The cooperative will analyze the loan application.

This analysis includes an assessment of the loan eligibility, such as the member's ability to repay the loan, the purpose of the loan, and the member's credit history. If the loan application is approved, the cooperative will enter into a credit agreement with the member. This credit agreement will set out the terms of the loan, such as the loan term, interest rate, and administrative fees. Once the credit agreement is signed, the cooperative will disburse the loan to the member. The member will then start paying the loan installments according to the credit agreement. The following is an explanation of each step in the flowchart:

1. Members apply for a loan: Cooperative members who wish to apply for a loan can come to the cooperative office or apply online. The member will then fill out a loan application form and submit it to the cooperative.
2. The cooperative analyzes the loan application: The cooperative will conduct an analysis of the loan application to assess the feasibility of the loan. This analysis includes an assessment of: The member's ability to repay the loan, purpose of the loan, the member's credit history
3. Cooperative approves or rejects the loan application: Based on the results of the analysis, the cooperative will approve or reject the loan application. If the loan application is approved, the cooperative will enter into a credit agreement with the member.
4. The cooperative makes a credit agreement: A credit agreement is a document that regulates the terms of the loan, such as the loan term, interest rate, and administration fee. The credit agreement must be signed by both parties, the member and the cooperative.
5. The cooperative disburses the loan: Once the credit agreement is signed, the cooperative will disburse the loan to the member. Loan disbursement can be done in cash or transfer.
6. Member pays loan installments: The member will then start paying the loan installments in accordance with the credit agreement. Loan installments can be paid in cash, transfer, or auto-debit.

The description of the current system is as follows:

1. Cooperative members must visit the admin section to make money storage transactions
2. Admin requests information in the form of Member's personal data and amount
3. Members provide personal data while the admin records the data
4. If you want to make a withdrawal, the member again provides data
5. Member informs the withdrawal amount
6. Admin checks the Member's deposit data
7. Admin hands over money and proof of withdrawal

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8. At a certain period, members will recap the data to be made into a report and submitted to the head of the cooperative.

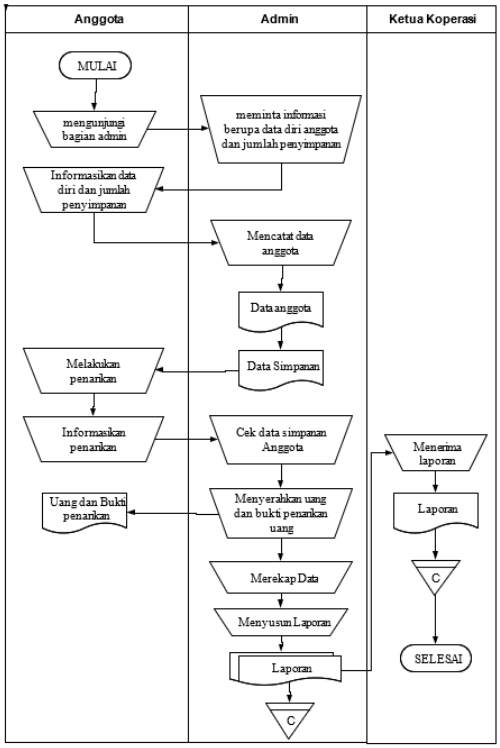

Fig. 3 Document Flow Chart of Cooperative Deposits and Withdrawals

3.2. Problems Based on Observation Results

Based on the results of observations, the authors concluded that the current data processing process still has several obstacles, namely

1. The recording process is relatively long, the data stored in the archive is likely to be lost or damaged
2. In calculating the total deposits and loans, the cooperative admin only uses a simple calculator calculation, if there is a miscalculation, the admin calculator will be reset to start counting from the beginning again.
3. In making reports, the admin hassles must recap the previous data which is already very much

From the above problems, the authors conclude that the manual process takes quite a long time to do and the inaccuracy of the resulting data.

3.3. Use Case Diagram

A use case diagram is a type of diagram in software engineering that presents the interactions between specific actors and the system functionalities offered by the system. They are used to model the functionality of a system and present the different ways in which actors (users or external systems) can interact with the system.

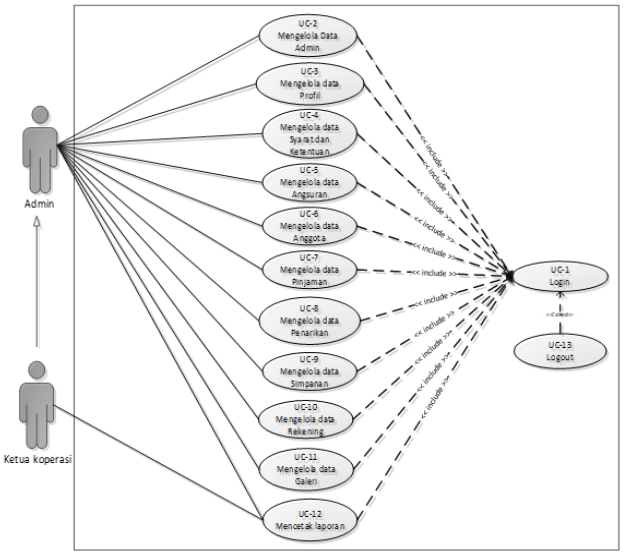

Fig. 4 Usecase Diagram Admin & Chairman

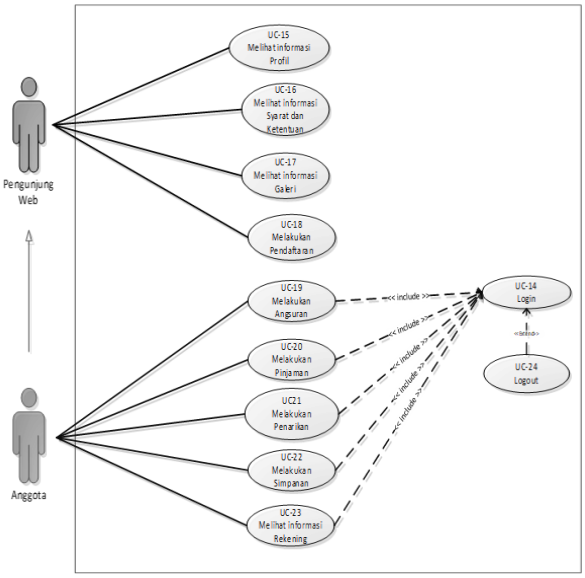

Fig. 5 Usecase User and Member

3.4. Class Diagram

A class diagram is a type of diagram in the Unified Modeling Language (UML) used to model the static structure of a software system. It presents the classes in the system, the relationships between them, and the attributes and methods they have. Class diagrams provide a static view of how the components in the system work together and interact.

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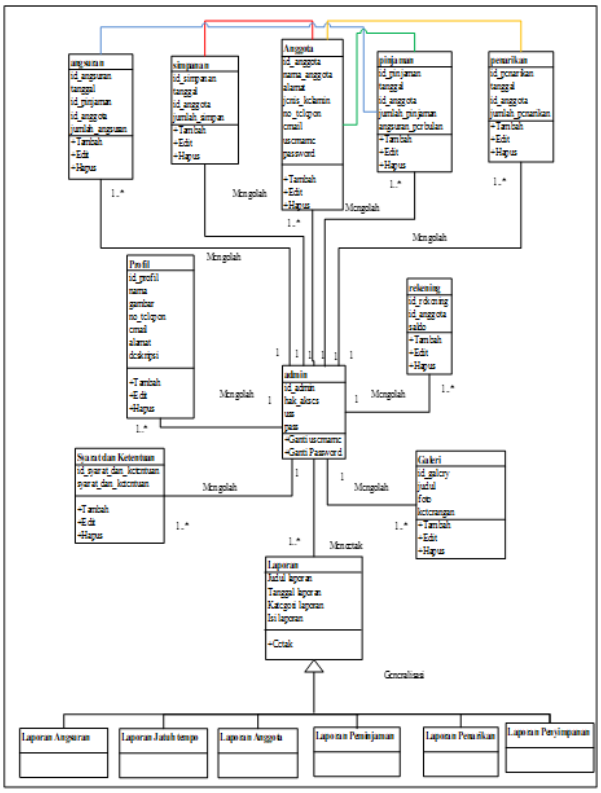

Fig. 6 Class Diagram

3.5. System Requirements Analysis & Implementation

Based on several existing problems, the author is interested in recommending a system that can be used as an alternative in introducing and assisting data processing.

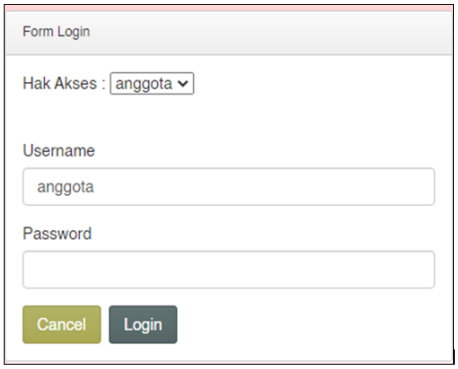

Fig. 7 Form Login Member

Fig. 8 Home Page Website

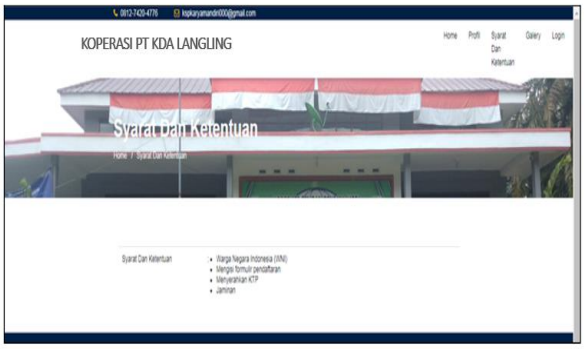

Fig. 9 Terms and conditions page

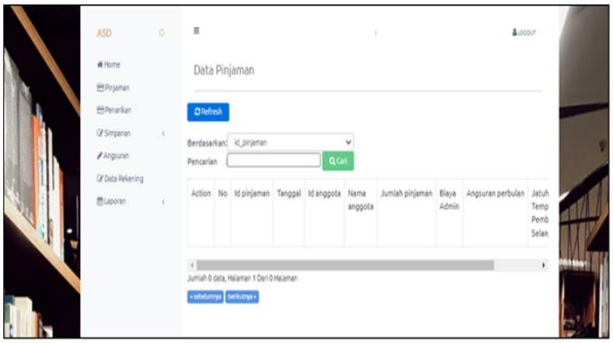

Fig. 10 Page Borrowing Data

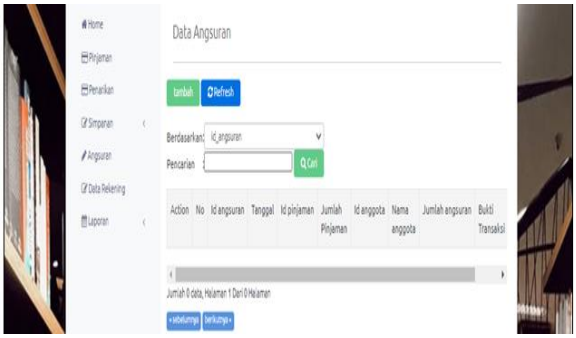

Fig. 11 Page Installment Data

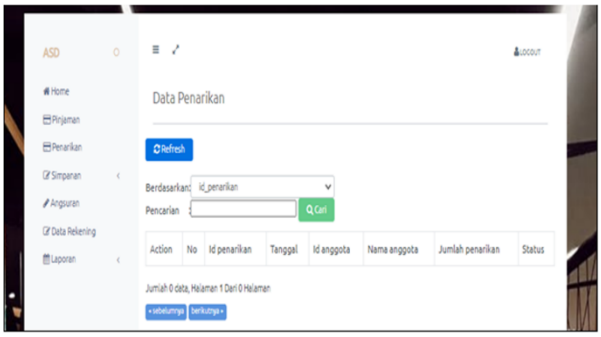

Fig. 12 Page Fund Withdrawal Data

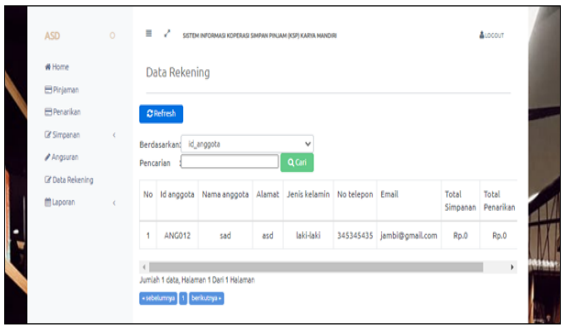

Fig. 13 Page Form Input Data Rekening

Fig. 14 Page Galery Koperasi PT KDA Langling

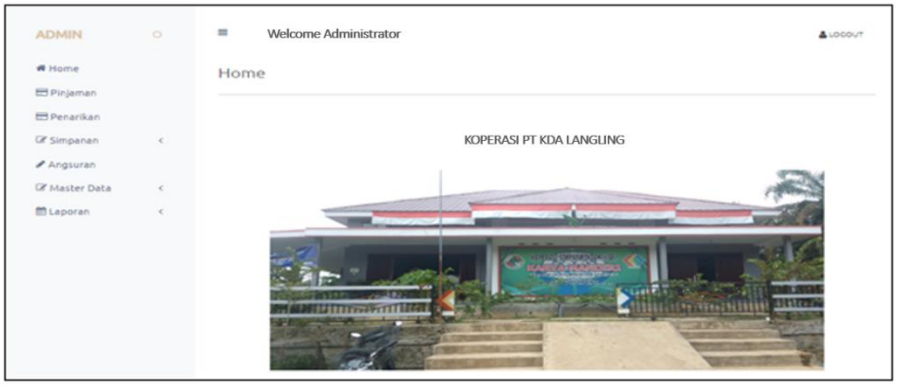

Fig. 15 Homepage Administrator

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4. CONCLUSION

Based on the research conducted, the application designed for Savings and Loan Information shows effectiveness in data processing and information access. The use of this application will significantly increase the effectiveness and efficiency in the management of Savings and Loan Information. In addition, features such as Installment Reports, Members, Loans, Withdrawals, Deposits, and online access to installment history will increase the ease for Admin and members in managing and monitoring Savings and Loan activities more efficiently. This system developed using the Laravel framework provides a good project structure, ORM (Eloquent), routing system, and many other features that facilitate the development of applications today. Then the author also added Laravel Passport which provides tools to implement OAuth2 API authentication. And JWT (JSON Web Tokens) JWT can be used to transmit authentication information as an encrypted JSON object and authorization from the PT KDA LAngling Savings and Loan application.

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