



# Design of Sharia Peer to Peer Lending Information System for Android Based Msmes (Aminah)

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**Abstract.** Based on survey results from the Indonesian Central Statistics Agency (BPS), it was noted that 69.02% of the assistance needed by MSMEs to survive was business capital. MSMEs that do not have official business entities have difficulty gaining access to funding sources, whether from conventional banking, cooperatives or government programs. The Central Statistics Agency also noted that there were very few MSEs who took business loans from banks for various reasons, including 6.36% because they did not know the procedures, 7.34% because the procedures were difficult, 1.09% because the application was rejected, 12, 69% due to high interest rates, and 12.37% did not have collateral. To help micro, small and medium enterprise (MSME) owners overcome capital shortages, the author will create an information system that implements Financial Technology (Fintech) with the concept of sharia-based peer to peer lending. This system will provide loans without complicated fees and high interest rates. This system will also act as a liaison between business owners who need loans and capital owners who want to help others. Based on the results of black box testing, this sharia peer to peer lending (Aminah) information system shows that its functionality is running well, with an average score of 90%. This shows that the system as a whole has met user expectations. Apart from that, the system was also considered very suitable for use, with an average score of 89%.

**Keywords:** Peer to peer lending syariah, Financial Technology, MSME, Android.

## 1 Introduction

### 1.1 A Subsection Sample

FinTech has become one of the fastest growing financial sectors in Indonesia. One of the most popular FinTech schemes is P2P Lending [1]. P2P Lending is a financial service that brings together lenders and loan recipients online.

Based on data from the Ministry of Cooperatives and Small and Medium Enterprises of the Republic of Indonesia, micro business groups have contributed to Indonesia's overall gross domestic product (GDP) of 61.9%. Micro business groups also contribute to labor absorption in Indonesia with a percentage of 97% of the total workforce in

Indonesia [2]. This proves that micro businesses have a big role in helping efforts to reduce poverty and unemployment.

FinTech has a significant contribution to national development, but in fact this sector still faces significant obstacles in its development [3]. Based on survey results from the Central Statistics Agency (BPS), the amount of assistance needed by business actors to survive is business capital. Capital and legal entities that are still non-formal are fundamental problems experienced by MSMEs. In the BPS publication entitled Profile of Micro and Small Industries in 2020, it was recorded that 88.39% of MSEs used entirely their own capital, 1.68% from other parties and 9.93% did business with joint venture capital. The small number of MSEs who take out business loans to banks for various reasons, including 6.36% because they don't know the procedures, 7.34% because the procedures are difficult, 1.09% because the proposal is rejected, 12.69% because the interest rate is low. high and 12.37% for the reason of not having collateral or guarantees [4].

Conventional financial institutions cannot meet the needs of micro businesses for access to financing and capital, resulting in a financing gap. Therefore, an alternative capital solution is needed through P2P Sharia Lending to help overcome micro business capital problems. The advantage of Sharia P2P Lending compared to conventional P2P Lending is that there are no interest rates and good transparency between capital providers and business owners, the terms and conditions use contracts that are in accordance with Islamic law and have been agreed upon by both parties [5].

Based on the previous problems and discussions, the author designed a FinTech information system using the Islamic peer to peer lending concept which allows for the absence of interest rates and heavy collateral requirements. This system was created to be a means to bring together micro business owners and capital owners in carrying out funding transactions with ease of administration. This system focuses on the micro business sector to make it easier for business owners to obtain additional capital and can also help capital owners to invest with a higher chance of success because capital owners can provide funding not only for one MSME at a time but can provide funding for several MSMEs in the same amount. which is not too big.

This research continues research from [6] with the title Design of a Sharia Peer to Peer Lending Information System for Web-Based MSMEs (AMINAH) by using a restful web service in integrating a web-based information system and an Android-based information system.

## 2 Theory

### 2.1 Peer To Peer Lending

**Conventional P2P Lending.** OJK Regulation Number 77/POJK.01/2016 regulates peer-to-peer lending activities in Indonesia currently. According to these regulations, peer to peer lending is a financial service that connects lenders and loan recipients

directly through an electronic system using the internet network. The purpose of this service is to facilitate lending and borrowing agreements in rupiah currency [7].

The FinTech lending marketplace model can be divided into several aspects. First, lenders (individuals or institutions) who have excess capital and are willing to lend at a certain rate of return. Then there is the second aspect, namely borrowers (individuals or MSMEs/institutions) who apply for loans from the P2P Lending platform. The P2P Lending platform then acts as a supporting aspect in the form of a marketplace that matches the borrower's loan needs with the financing capital provided by the lender. In the third aspect (loan disbursement aspect), individual borrowers can receive cash payments or full installments. The final aspect is the repayment or payment aspect, which is usually available online (e-commerce or bank transfer) and offline (retail stores or agents) [8].

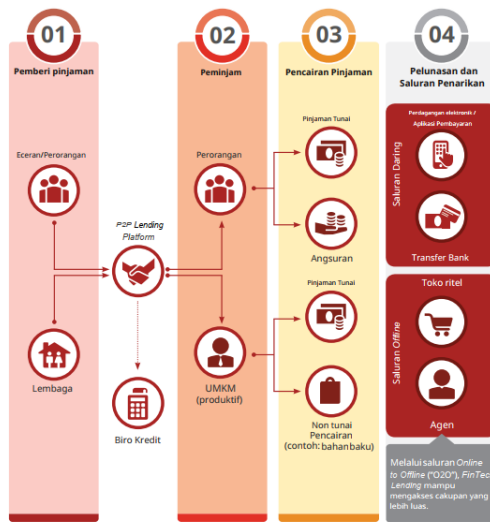


Fig. 1. Type of marketplace Fintech Lending Model

**P2P Lending Syariah.** Sharia Peer To Peer Lending is a financial service provider that operates based on sharia principles. Its function is to connect funders and recipients of funds to carry out funding contracts [9]. Loans and investments require a clear agreement between both parties, which is called a contract. This contract consists of three types, namely:

- a. A Murabahah contract is a sale and purchase agreement for goods with a selling price that is higher than the purchase price. This price difference is called profit.
- b. A Musyarakah contract is a form of cooperation between two or more parties in a business, where each party contributes funds. Profit sharing is carried out in accordance with the agreement, while losses are divided based on the proportion of each party's contribution of funds.
- c. A Mudharabah Agreement is a form of cooperation between at least two parties, where one party provides capital, while the other party is responsible for managing

the capital. Profit sharing is carried out in accordance with the agreement, and the capital owner bears the losses, unless the losses are caused by management error.

Based on the contracts in Islamic law, this will be the guideline for creating sharia FinTech.

## **2.2 Aminah**

Aminah is an Android-based application which aims to be a Sharia P2P Lending platform in the form of a FinTech Lending marketplace. This application aims to help the development of MSMEs in Indonesia by providing opportunities for business owners to seek additional capital with fairly easy conditions to develop their business. This application helps bring together or connect capital owners as investors with business owners as capital borrowers. Aminah is P2P Sharia Lending which is based on a profit sharing system to avoid usury based on lending contracts in Islamic law.

Aminah offers simple lending transactions using technology as the main component. So, it can be accessed anytime, anywhere, and by anyone. The benefits offered to capital owners are in the form of a means to invest and help other people as well as profits from sharing business results. For business owners, the benefits offered are in the form of financial assistance for business development or can be in the form of raw materials for the owner's business needs without having to fulfill difficult and complicated loan requirements.

## **2.3 Android**

Android is a collection of software components for mobile devices that includes the operating system, middleware, and key applications. The Android operating system is one of the most widely used mobile operating systems today. Android is a Linux-based operating system that is open source and has been developed by Google [10]. To develop Android, in 2007 the Open Handset Alliance (OHA) was formed, a consortium of several companies whose aim was to develop open standards for mobile devices [11].

Developers can create Android applications by utilizing the Android SDK (Software Development Kit), which provides various libraries to assist them in developing programs on the Android operating system.

## **2.4 Extreme Programming**

The XP development cycle occurs over a time span ranging from years to days. The customer (customer/investor) chooses which part will be worked on first based on the features (in XP called stories) that are the most valuable of all the features, this is determined based on the cost of making the feature and the speed of the development team in implementing the feature up to the release stage, and so on until all the features in the system have been released. Developers (programmers) change a feature (stories) into smaller tasks to be done by everyone in the development team, then the developer makes a task into a set of cases (in XP called iterations) that will be demonstrated to show that all tasks have been completed. Developers work together with customers in

each test case set and develop the overall system design from the beginning to the end of the released system [12].

Extreme Programming has 4 stages that must be carried out in one iteration, namely:

1. Planning (Planning): In the initial stage, activities are carried out to determine what needs to be done, including identifying problems, understanding user needs, and establishing a system development schedule.
2. Design (Designing): This stage creates a system model, including the overall system model, system architecture model, and database model.
3. Coding (Coding): At this stage, the system model that has been created is applied to program code.
4. Testing (Testing): After the program code has been written, system testing is carried out to ensure that the system meets user needs.

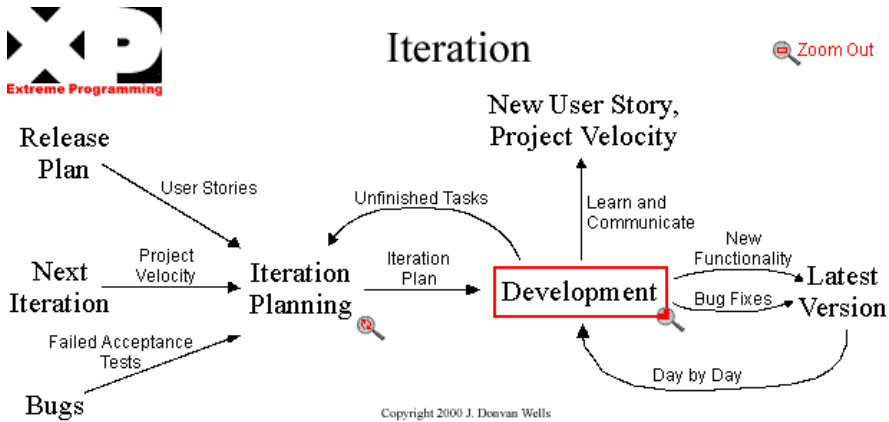


Fig. 2. Iteration on Extreme Programming (Wells, 2013)

### 3 Implementation

This research uses the Extreme Programming method as its development method. By using this method, the focus of this development is centered on customer satisfaction.

#### 3.1 Needs Analysis

At this stage the author collects requirements from various sources. One source is an online discussion with Aminah's investor.

The functional requirements of this system are:

1. Users can download the application and see the appearance of the application without having to have an account and log in.
2. Users can register as a business owner (borrower) or financier (lender). Users are required to fill out a registration form based on the registration category to be able to have an account.
3. The system can display business owners who have been selected and are ready to be funded on the lender's home page.
4. Investors (lenders) can view details of the business owner and provide funding based on the number of units they want to fund.
5. Investors (lenders) can withdraw money/profit sharing balance after the funding process is complete and the business owner makes a return.
6. Business owners can have a funding account after the funding application data is declared to have passed verification by the admin when registering as a business owner.
7. Admin can monitor and regulate the stability of the system by logging in.
8. The business owner's data will be entered into the admin data and will be reviewed by the admin before the business owner is designated as an official partner of Aminah.
9. Business owners whose data is declared to have passed review by the admin can log in using the account created by the admin.
10. Business owners (borrowers) can monitor the ongoing funding process and withdraw capital when the fund search process is complete by logging in.
11. Admin can see funding process activities between lenders and borrowers.
12. Admin can delete the borrower's account if the funding has been completed and the profit-sharing payment has been received by all related parties.
13. Admin can withdraw balance from incoming wages.

### 3.2 Release Planning

**Use Case Diagram.** By using the extreme programming method, the next step that must be taken is to create a release plan. Based on the user story told by the customer, a use case diagram is created so that the results of the discussion with the customer can be seen clearly as in the image below.

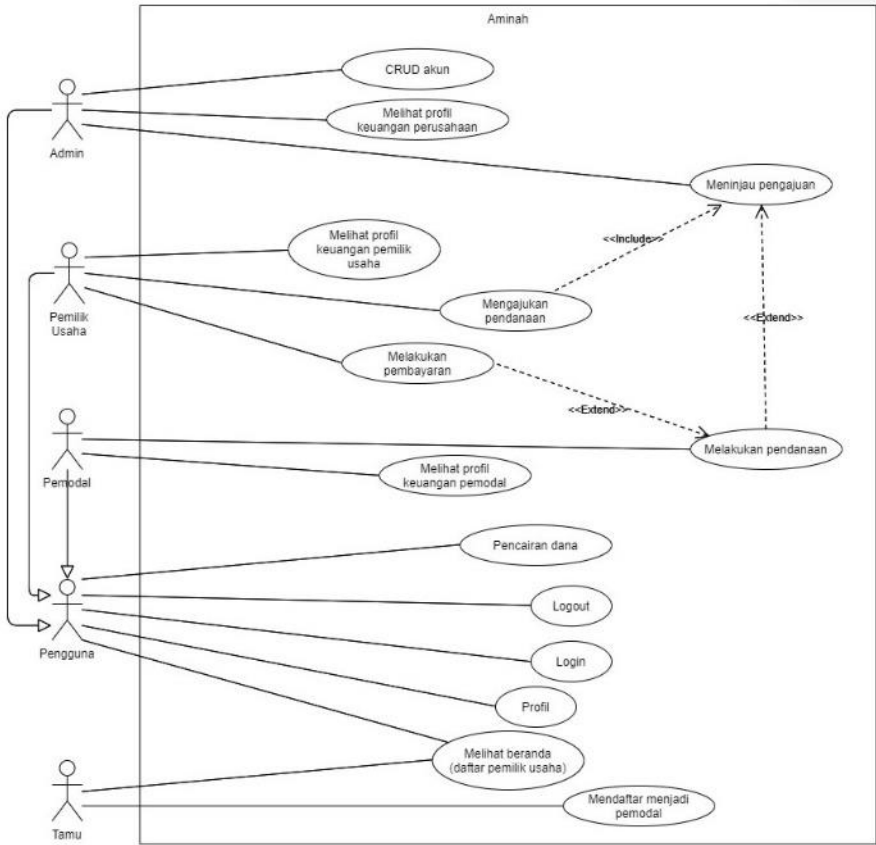


Fig. 3. Use case diagram of AMINAH

**User Stories.** User stories are notes that describe what users want to do with software. These notes are used by developers to determine what features and functions need to be in the software, as well as to estimate software release times.

Table 1. User stories

User	Code	User Stories
Borrower	Story-1	Borrowers can register an account.
	Story-2	Borrowers can fill out the account registration form.
	Story-3	Borrowers can log in to their accounts.
Borrower	Story-4	Borrowers can apply for funding.
	Story-5	Borrowers can fill out the funding application form.
	Story-6	Borrowers can view details of funding applications.
Integrasi Admin	Story-7	Admin can review and select business owner funding applications.
Lender	Story-8	Lenders can register an account.

User	Code	User Stories
	<i>Story-9</i>	Lenders can fill out an account registration form.
	<i>Story-10</i>	Lenders can log in if they already have an account.
	<i>Story-11</i>	Lenders can complete the profile.
	<i>Story-12</i>	Lenders can see a list of business owners who are ready to be funded.
	<i>Story-13</i>	Lenders can choose which businesses to fund into the basket.
	<i>Story-14</i>	Lenders can view the shopping cart.
	<i>Story-15</i>	Lenders can top up balances and make payments.
	<i>Story-16</i>	Lenders can checkout the business options to be funded in the basket.
Integrasi Admin	<i>Story-17</i>	Admin can view and manage financial/transaction data.
Borrower	<i>Story-18</i>	Borrowers can withdraw funding money.
	<i>Story-19</i>	Borrowers can make profit sharing payments.
	<i>Story-20</i>	Lenders can see the status of the funding process.
	<i>Story-21</i>	Lenders can withdraw balances when the funding status is complete.
Lender	<i>Story-22</i>	Lenders can see the entire list of transactions carried out by the lender.
	<i>Story-23</i>	Lenders can see details of transactions carried out by lenders.
Borrower	<i>Story-24</i>	Borrowers can see the entire list of transactions carried out.
Lender	<i>Story-25</i>	Borrower can see details of transactions that have been made.
	<i>Story-26</i>	Guests can see a list of business owners who are ready to be funded without needing to register and log in to an account.
Guest	<i>Story-27</i>	Guests can see information about Aminah

**Class Diagram.** Class diagrams describe class names, attributes and relationships between classes in the system.



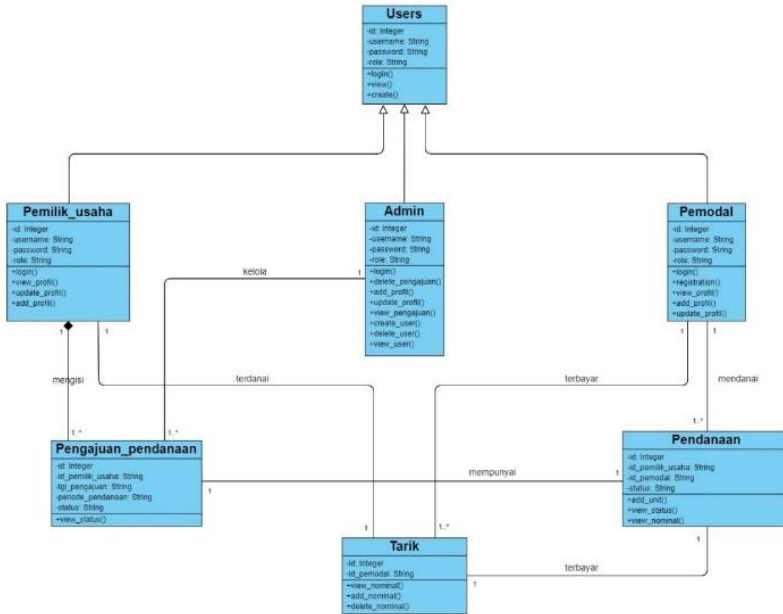


Fig. 4. Class diagram of Aminah

### Entity Relationship Diagram

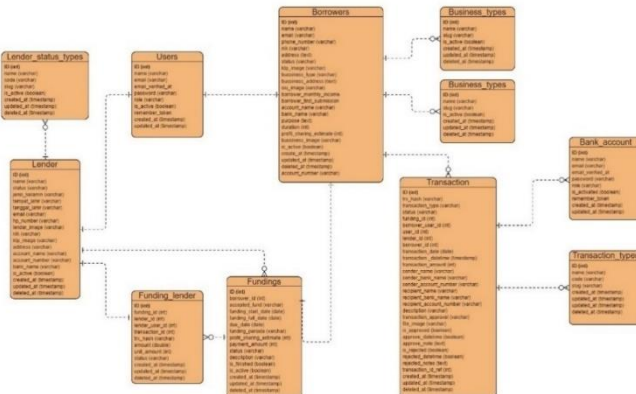


Fig 5. Entity relationship diagram Aminah

### 3.3 Iteration

Class diagrams describe class names, attributes and relationships between classes in the system.

**Table 2.** First Iteration

1 <sup>st</sup> Iteration		1 – 27 October 2023
No	Story	User story
1	Story-1	Borrowers can register an account.
2	Story-2	Borrowers can fill out the account registration form.
3	Story-3	Borrowers can log in to their accounts.
4	Story-4	Borrowers can apply for funding.
5	Story-5	Borrowers can fill out the funding application form.
6	Story-6	Borrowers can view details of funding applications.
7	Story-7	Admin can review and select business owner funding applications.

After all the tasks in the user stories table that have been determined for iteration 1 are completed, the author carries out testing to check the system.

**Table 3.** Second Iteration

2 <sup>nd</sup> Iteration		29 November – 28 December 2023
No	Story	User story
1	Story-8	Lenders can register an account.
2	Story-9	Lenders can fill out an account registration form.
3	Story-10	Lenders can log in if they already have an account.
4	Story-11	Lenders can complete the profile.
5	Story-12	Lenders can see a list of business owners who are ready to be funded.
6	Story-13	Lenders can choose which businesses to fund into the basket.
7	Story-14	Lenders can view the shopping cart.
8	Story-15	Lenders can checkout the business options to be funded in the basket.

Next, after all the tasks in the user stories table that have been determined for iteration 2 are completed, the author carries out testing to check the system.

**Table 4.** Third Iteration

3 <sup>rd</sup> Iteration		29 December 2023 – 2 January 2024
No	Story	User story
1	Story-15	Lenders can top up balances and make payments.

3 <sup>rd</sup> Iteration		29 December 2023 – 2 January 2024
2	Story-16	Admin can view and manage financial/transaction data.
3	Story-17	Borrowers can withdraw funding money.
4	Story-18	Borrowers can make profit sharing payments.
5	Story-19	Lenders can see the status of the funding process.
6	Story-20	Lenders can withdraw balances when the funding status is complete.
7	Story-21	Lenders can top up balances and make payments.

Next, after all the tasks in the user stories table that have been determined for iteration 3 are completed, the author carries out testing to check the system.

**Table 5. Fourth Iteration**

4 <sup>th</sup> Iteration		3 January 2024 – 11 January 2024
No	Story	User story
1	Story-22	Lenders can see the entire list of transactions carried out.
2	Story-23	Borrowers can see the entire list of transactions carried out.
3	Story-24	Lenders can see_details of transactions that have_been_done.
4	Story-25	Borrower can see details of transactions that have been made.
5	Story-26	Guests can see a list of business owners who are ready to be funded without needing to register and log in to an account.
6	Story-27	Guests can see information about Aminah.

After all tasks are completed, the author tests the system to ensure the functions and features work correctly. System testing was carried out in stages, starting from task testing for iteration 4, then testing the function and features of the system as a whole, and finally testing functionality using black box testing on other users.

### 3.4 Acceptance Test

After the system is built, the system needs to be tested to ensure that the system meets user needs and that the system operates well and there are no errors. Testing will be carried out involving the internal development team and users.

## 4 Result and Discussion

This research uses a Likert scale to measure respondents' satisfaction with the system being tested.

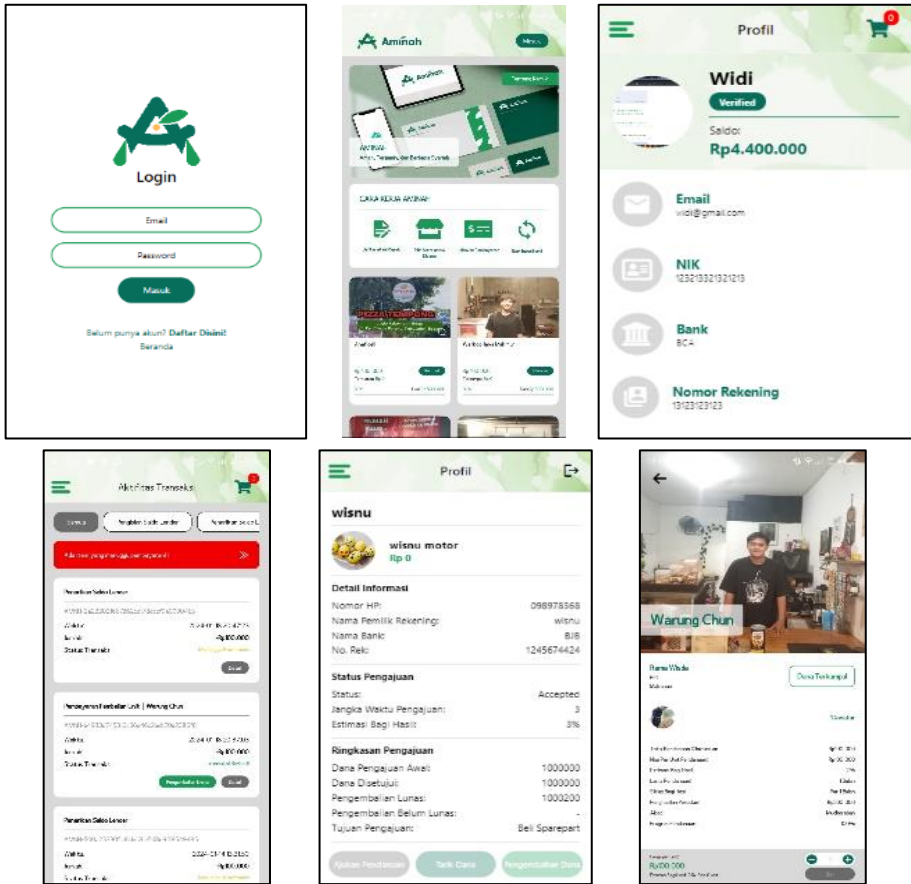


Fig 6. User interface

#### 4.1 Functionality Test Results by Borrower

In the borrower actor test, there were 5 respondents who were business owners in the West Pamulang sub-district area.

Table 6. Fungsionalitiy result test for borrower

Name	Brand	Question					
		1	2	3	4	5	6
Albagus	Ayam Geprek Joder Ka Dhani	5	5	5	4	5	4
Althaf. S. A	Coffee Beer Pamulang	5	5	4	5	5	5

Rama Wisda	Warung Chun	5	5	4	4	5	5
M. Fadhil	Warkop Jaya Makmur	5	5	5	5	5	5
Daffa Al Falah	Roccee Coffee	5	5	5	5	5	4

Total Value = (0 × 1) + (0 × 2) + (0 × 3) + (6 × 4) + (24 × 5) = 144 Max Value = 5 x 5 x 6 = 150. Based on the maximum value calculation results 100 then the percentage of system functionality can be calculated using a Likert scale as follows:

$$\text{Eligibility Percentage} = \frac{144}{150} \times 100\% = 96\%$$

### 4.2 Results of Functionality Testing by Lender

In testing lender actors, there were 5 respondents who were business owners in the West Pamulang sub-district area.

**Table 7.** Results of Functionality Testing by Lender

Name	Address	Question								
		1	2	3	4	5	6	7	8	9
Rino Akbariano	Pamulang	4	5	4	4	3	5	5	5	3
Dzulbasa Harahap	Pamulang	5	5	4	4	5	5	5	5	4
Adli Evan Nagatara	Pamulang	4	4	4	3	5	5	4	5	3
Ghifari Ramadhan	Pamulang	5	5	4	4	4	4	5	5	3
Zuliyanti	Pamulang	5	5	5	3	5	4	4	4	4

Total Value = (0 × 1) + (0 × 2) + (6 × 3) + (17 × 4) + (21 × 5) = 191 Max Value = 5 x 5 x 9 = 225. Based on the maximum value calculation results 100 then the percentage of system functionality can be calculated using a Likert scale as follows:

$$\text{Eligibility Percentage} = \frac{191}{225} \times 100\% = 84\%$$

### 4.3 Results of Functionality Testing by Guests

In the guest actor test, there were 7 respondents who were business owners in the West Pamulang sub-district area.

**Table 8.** Testing by guest

Name	Address	Question				
		1	2	3	4	5
Maulana Pratama	Pamulang	5	4	5	2	3
Arjuna Arfandi	Pamulang	4	4	5	4	4

Agasi Habib	Pamulang	5	5	5	3	4
Muhammad Riki	Pamulang	5	5	5	5	5
Akhmad Alfarizi	Pamulang	5	5	4	5	5
Ramiz Fachryal Aulia	Pamulang	4	4	5	5	4
Muhammad Alif Bahri	Pamulang	5	5	5	5	5

Total Value =  $(0 \times 1) + (1 \times 2) + (2 \times 3) + (10 \times 4) + (22 \times 5) = 158$  Max Value =  $7 \times 5 \times 5 = 175$ . Based on the maximum value calculation results 100 then the percentage of system functionality can be calculated using a Likert scale as follows:

$$\text{Eligibility Percentage} = \frac{158}{175} \times 100\% = 90\%$$

#### 4.4 Overall System Test Results

The results of system testing carried out by the author on all users, including lenders (fund owners), borrowers (MSME owners), and guests (visitors), show that this system can work well. The percentage of system feasibility after the functionality test is carried out is as follows.

Functionality Test Results for All Users

- a. Testing by borrower: 96%
- b. Testing by lenders: 84%
- c. Guest testing: 90%

$$\text{Total Eligibility Percentage}(\%) = \frac{96\%+84\%+90\%}{3} = 90\%$$

User testing shows a 90% satisfaction level with the functionality of the Aminah Android application. This means all features work as expected, making the system ready to launch and use.

## 5 Conclusion

Based on the results of Aminah's peer to peer lending application development using the extreme programming model and functionality testing using the black box testing method, it shows that the system meets all the specified functionality requirements, it can be concluded as follows:

1. Aminah is an Android-based peer to peer lending information system for MSMEs that connects business owners who need capital with capital owners who want to help others. This system allows capital owners to provide capital to MSMEs with funds that are not too large but is still useful because one MSME will be funded by several lenders.

2. This Android-based peer to peer lending information system for MSMEs (Aminah) uses JavaScript and React Native as the programming language and framework for its development.
3. Based on the overall system functionality test using the black box testing method and the Likert scale assessment method, the results obtained were that 90% of the system features were in accordance with the user's expected results. Therefore, it can be concluded that the system features are very feasible or very suitable for user needs.

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