

SHARIA CROWDFUNDING APPLICATION BACKEND DESIGN FOR MSME FUNDING USING EXTREME PROGRAMMING METHOD

Febrian Wulandari^{1*}, Rahmat Fauzi¹, Ahmad Musnansyah¹

¹Bachelor of Information Systems Study Program, Telkom University

email: *febrianwulandari@student.telkomuniversity.ac.id

Abstract: Micro, Small, and Medium Enterprises (MSMEs) play a crucial role in the economic growth of Indonesia. However, their contribution has not reached its maximum potential, with over 40% of MSMEs facing various challenges, one of which is funding. The funding issue has become a hindrance to the growth of this sector. One contributing factor is the difficulty in obtaining loans with high interest rates. Crowdfunding has been considered a potential solution, but it has not been fully utilized due to the lack of literacy and negative cases surrounding it. In this context, the development of a Shariah-compliant crowdfunding application is seen as a suitable solution, given the government's efforts to strengthen the Shariah economic ecosystem. To support this application's development, the Laravel framework and the Extreme Programming method, emphasizing simplicity and accelerating the development process, are employed. The result of this research is the implementation of the UML design and system logic, resulting in the Tasha Crowdfunding application as a funding solution for MSMEs. It can accelerate the development process. The research outcomes include the backend implementation of the UML design and system logic, with a 100% successful blackbox testing result, leading to the creation of the Tasha Crowdfunding application as an MSME funding solution.

Keywords: backend services; crowdfunding syariah; extreme programming; MSMEs.

Abstrak: Di Indonesia Usaha Mikro Kecil Menengah (UMKM) mempunyai peran yang sangat penting bagi pertumbuhan perekonomian negara. Meskipun demikian, ternyata kontribusi yang diberikan oleh UMKM belum mencapai angka yang maksimum dikarenakan lebih dari 40% UMKM masih mengalami banyak permasalahan salah satunya adalah pendanaan. Permasalahan pendanaan yang dihadapi oleh Usaha Mikro Kecil Menengah (UMKM) di Indonesia telah menjadi penghambat pertumbuhan sektor ini. Salah satu faktor penyebabnya adalah kesulitan dalam memperoleh pinjaman dengan suku bunga yang tinggi. *Crowdfunding* telah dianggap sebagai solusi potensial, namun belum dimanfaatkan secara optimal karena kurangnya literasi dan kasus negatif yang terjadi. Dalam konteks ini, pengembangan aplikasi *crowdfunding syariah* dianggap sebagai solusi yang cocok, mengingat penguatan ekosistem ekonomi syariah yang sedang dilakukan oleh pemerintah. Untuk mendukung pengembangan aplikasi ini, digunakan *framework laravel* dan metode *Extreme programming* yang menekankan kesederhanaan dan percepatan proses pengembangan. Hasil penelitian ini berupa implementasi perancangan UML dan logika sistem yang menghasilkan aplikasi Tasha *Crowdfunding* sebagai solusi pendanaan UMKM. dapat mempercepat proses pengembangan. Hasil dari penelitian ini berupa implementasi backend dari perancangan UML dan logika sistem yang telah dibuat dengan hasil pengujian blackbox testing 100% sukses dan menghasilkan aplikasi tasha *crowdfunding* sebagai solusi pendanaan UMKM.

Kata kunci: backend service; crowdfunding syariah; extreme programming; UMKM.

INTRODUCTION

The end of the COVID-19 pandemic has had a significant impact on various sectors in Indonesia, including the economic sector, it can be seen that in 2020 the Indonesian state is threatened with an economic crisis caused by the COVID-19 pandemic [1]. MSMEs have an important role in the country's economic growth. In 2018, MSMEs contributed 60.34% to Indonesia's Gross Domestic Product (GDP). However, the contribution of MSMEs has still not reached the maximum number, with more than 40% of MSMEs experiencing funding problems [2]. The difficulty of access to banking as the main source of capital is an obstacle, which hampers MSME export activities due to limited funds and dependence on banking funds.

Limited MSME funds have become a public issue because many conventional banks refuse to provide credit to MSMEs [3]. This is due to poor assessment of the creditworthiness of MSMEs due to low working capital and lack of guarantees. To counter this risk, many conventional banks apply high interest rates to internal funding sources such as trade credit for MSMEs. To overcome these problems, crowdfunding is present as a new solution for MSME funding. Crowdfunding has become one of the significant alternative sources of funds for MSMEs in Indonesia [4]. However, there are still limitations in the use of crowdfunding by MSME players in Indonesia, especially in rural areas. Based on previous research entitled *The Phenomenon of Crowdfunding Development in Indonesia* which has been designed by Arief Yuswanto et al. In his research, Arief said that there are still many people who do not know about crowdfunding, which causes

entrepreneurship in Indonesia to be less developed because it still relies on conventional concepts [5]. This is supported by the results of previous research conducted by Bahauddin who said that there are many negative things about crowdfunding circulating in the community such as the risk of fraud, the length of the refund process, loss of communication between the recipient of funds and the funder, and the discrepancy of the refund with the promised schedule, there are even cases of funds that are not returned in their entirety to the funder and this is what resulting in a lack of public interest in crowdfunding [6].

Apart from the development of crowdfunding in Indonesia, the Indonesian government is currently strengthening the Islamic economic ecosystem considering that the majority of Indonesia's population is Muslim. Public enthusiasm for sharia economic growth is very high, especially with the establishment of Islamic Financial Institutions, one of which is sharia fintech [7]. This is supported by the high demand for the business capital system through sharia fintech by MSMEs. Where one of the innovations of sharia fintech is sharia crowdfunding.

Based on the results of previous research and also the problems that have been described, it is necessary to develop a sharia crowdfunding application that is in accordance with sharia values to make it easier for MSMEs to get funds without interest and in accordance with sharia economic principles [8]. Through sharia crowdfunding, MSME players can apply for funding easily without the burden of paying interest and providing guarantees. The ease of access to capital makes MSMEs have the opportunity to develop their business towards global economic competition [9].

In the design process, this application will be designed using extreme programming methods and the laravel framework. The extreme programming method itself is a lightweight method for a small to medium class software development team with vague or often changing needs [10].

The extreme programming method was chosen because it can speed up the implementation process and can apply the principle of simplicity considering the conditions of the resources of this study only have six development teams so that the extreme programming method is very suitable to be implemented in this study. This method involves the planning, design, coding, and testing phases [11].

METHOD

The method that will be used in this study is the extreme programming method. Extreme programming is a software development model that simplifies the various stages of system development to be more efficient, adaptive and flexible [12]. The extreme programming method is chosen in the development of Islamic crowdfunding applications because it has several advantages, one of which is the simplicity system. In the development process, features that are not really needed will be removed to shorten development time. The stages of research that will be carried out consist of stages of planning, design, coding, testing, and ended with the release of the application. The following will be described about each stage in the extreme programming method.

Planning

The planning stage is the beginning of the software requirements analysis process. This involves user interviews, user story card determination, application actors, features, and development modules. Predetermined features will be developed according to the priority scale in each development module. After designing the priority scale, the process will proceed to the next stage.

Design

The design stage is the stage when application design is carried out. It involves creating use case diagrams, use case scenarios, activity diagrams, sequence diagrams, ERDs, class diagrams, and other UML diagrams. The goal is to help developers understand the needs of the software to be built. After that, the SQL database design will also be designed using MySQL and the last stage is the design of the REST API.

Coding

The coding stage is the implementation stage of all UML diagrams and database designs that have been designed at the design stage to be converted into the form of a programming language. At this coding stage, the code will be made as simple as possible to reduce the system design time to be completed faster.

Testing

The last stage is the testing stage of the software code that has been designed. The test results are evaluated by the team which will later be used as a reference for the next stage of development before the application is released. Once testing is complete, the app will be released to users to get

feedback and do further development.

RESULTS AND DISCUSSION

After carrying out the design and implementation process, the following will be presented about the results of the design and implementation process based on the results of the system needs analysis that has been carried out.

1st Iteration

This 1st iteration stage will focus on developing module 1 related to uploading previously planned MSME projects. This module is used by MSME actors to upload projects and see a list of projects that have been uploaded into the system. The following will be displayed the results of the implementation where the first is the MSME dashboard feature, which is the main page for MSME players after successfully logging into the application. This dashboard displays a summary of all projects owned by MSME actors. Image 1 shows the implementation results of the MSME actor dashboard feature.



Image 1. MSME Dashboard

After the MSME dashboard, there is a feature to upload MSME projects. This feature is the main feature of the application where this feature is the first

stage when MSMEs want to get funding, then MSMEs must submit their projects to this feature. In Image 2 and 3, the following will be presented the results of the implementation of the MSME project upload feature.

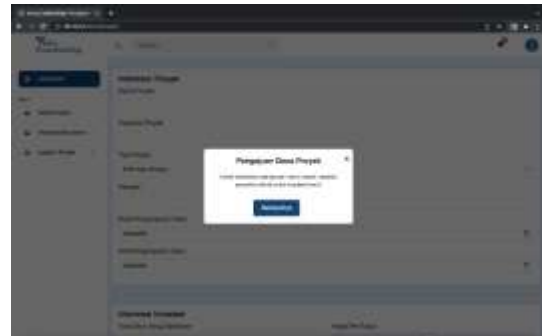


Image 2. Upload Project

Image 3 presented about modals before MSME upload the projects and Image 4 presented about form input projects.



Image 3. Upload Project

After knowing about the features of the next MSME project, in Image 4, the project list feature will be presented. This feature is a feature that will display a list of projects that have been uploaded by MSME actors. In this feature, MSME actors can see a list of projects that have been uploaded and see the status of their project submissions at which stage.



Image 4. List of MSME Projects

Furthermore, there is an approval feature from the administrator side of the Tasha application. In this feature, administrators are given the authority to check MSME projects and then determine whether to accept or reject them. In Image 5 below, the results of the implementation of administrator approval for MSME projects have been described.



Image 5. MSME Project Approval

System Testing

After the system implementation stage, the system will be tested using blackbox testing. This test aims to find out whether the system has been successfully used in accordance with the form provided. In Table 1 below, the results of blackbox testing will be displayed on the system in the MSME project module in the 1st iteration stage.

Table 1. Blackbox Testing Iteration 1 Test Results

Feature Name	Testing Phase	Desired results	Result
Upload MSME Project	<ol style="list-style-type: none"> 1. Access the MSME project upload page 2. Input data according to the form 3. Submit data 	MSMEs have successfully uploaded projects and projects are included in the project list	Success
View Project List	<ol style="list-style-type: none"> 1. Access the project page list 2. View project data lists 	MSME actors successfully access the project page list and view project data	Success
MSME Project Approval	<ol style="list-style-type: none"> 1. Access the MSME project submission page 2. Conduct project checks 3. Submit approval / rejected project 	The admin has successfully approved the project that has been submitted by MSMEs	Success

Based on the tests that have been carried out, it has been obtained that the entire application feature in the 1st iteration has successfully run as needed. With 100% successful testing value.

2nd Iteration

Furthermore, the 2nd iteration will focus on developing module 2 regarding MSME reports according to what has been previously designed. This module will be used by MSME actors in uploading project reports and viewing a list of reports that have been uploaded to the system. The following will be displayed the results of the implementation, the first is the report upload feature. This feature will be used by MSME actors to upload reports that have been made. The report that has been made will be used as a condition before MSMEs return funds to investors. In Image 6, the implementation results of the upload report have been presented.

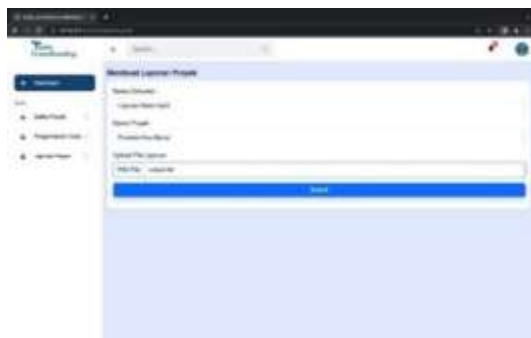


Image 1. Upload Report

After the implementation of the report upload feature, then in Image 7 below will be described the implementation of the project report list feature. This feature is made to help MSMEs see the progress of reports that have been uploaded through the status column. In this feature, MSME actors can see the status of the report whether it

has been received or rejected by the system.



Image 2. List of Project Reports

After describing the implementation of the project report feature, Image 8 will then describe the implementation of the report approval feature on the administrator side. The administrator will be authorized to check and accept or reject reports that have been inputted by MSME actors.



Image 3. MSME Project Approval

After the implementation results of the project approval feature. Then the implementation results of the project report viewing feature will be presented on the investor side. Investors can see project reports that have been received by administrator to see reports related to funding that has been done. Image 9 will present the implementation results from looking at the project report on the investor side.



Image 4. View Reports (Investors)

System Testing

At this stage, system testing will be carried out using blackbox testing to find out whether the system has been successfully used in accordance with the form provided. In Table 2 below, the results of blackbox testing in the 2nd iteration stage module will be displayed to find out whether the project report upload feature, see the project report list, report approval, and see the report that has been received by the administrator from the investor side is running.

Table 2. Blackbox Testing Iteration 2 Test Results

Feature Name	Testing Phase	Desired results	Result
Upload MSME Project Report	<ol style="list-style-type: none"> 1. Access the report upload page 2. Input data according to the form 3. Submit data 	MSMEs have successfully uploaded project reports and project reports are included in the project report list	Success
View List of Project Reports	<ol style="list-style-type: none"> 1. Access the project page list 2. View project data lists 	MSME actors successfully access the project report page list and view project report data	Success
MSME Project Report Approval	<ol style="list-style-type: none"> 1. Access the report submission page 2. Check reports 3. Submit approval / rejected report 	The admin has successfully approved the project report that has been submitted by MSMEs	Success
View Admin (Investor) Approval Report	<ol style="list-style-type: none"> 1. Access the project page then portfolio and portfolio details 2. View a list of reports that have been approved by the admin 	Investors successfully see the list of reports that have been approved by the admin	Success

Based on the tests that have been carried out, it has been obtained that the entire application features in the 2nd iteration have successfully run as needed. With 100% successful testing value.

3rd Iteration

The 3rd iteration will focus on developing module 3 regarding refunds from MSME players to investors as previously designed. This module will be used by MSME actors in uploading refund applications and viewing the list of refunds that have been made. Here are the implementation results that have been done for the refund module. Where the first is the refund application upload feature. In Image 10 below, the results of the implementation of the refund submission upload feature to investors will be presented. This feature is a feature that will be used by MSME actors to upload refund applications provided that the project report has been received by the administrator.

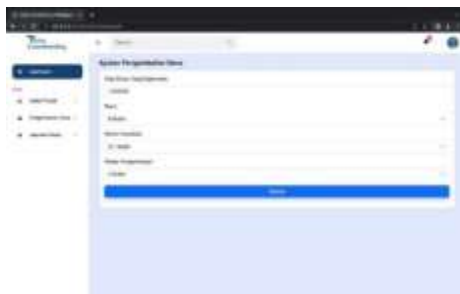


Image 5. Upload Returns

Furthermore, in Image 11, the implementation results of the refund submission list feature to investors have been described. Where in this feature MSME actors can see a list of the entire return submission data that they have uploaded on the application.



Image 6. Return List

After the submission is successfully uploaded and entered into the list, the results of the implementation of the return submission approval feature will be presented by the administrator. In this feature, the administrator is authorized to check the refund application, whether the returned funds are in accordance with the report or not. Furthermore, the administrator is also authorized to approve the submission of returns that have been made, if according to the administrator the funds are appropriate, the administrator will approve otherwise the administrator has the right to refuse. The results of the application implementation will be presented in Image 12 below.



Image 7. Return Approval

System Testing

After carrying out the system implementation stage, then at this stage will be carried out system testing using blackbox testing. In Table 3 below will present the results of blackbox testing on the system in the 3rd iteration.

Table 3. Blackbox Testing Iteration 3 Test Results

Feature Name	Testing Phase	Desired results	Result
Upload MSME Project refunds	1. Access the refund request upload page 2. Input data according to the form 3. Submit data	MSMEs have successfully uploaded project fund applications and fund applications are included in the project fund application list	Success
See MSME Project Refunds List	1. Access the refund page list 2. View refund list data	MSME actors have successfully accessed the fund application page list and viewed project fund application data	Success
MSME Project refund approval	1. Access the refund application page 2. Check refund submission approval / rejected refund	The admin has successfully approved the application for funds that have been submitted by MSMEs	Success

Based on the tests that have been carried out, it has been obtained that the entire application feature in the 3rd iteration has successfully run as needed. With 100% successful testing value.

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that in this study the design of backend services using extreme programming methods to build sharia crowdfunding applications as a funding solution for MSMEs was successfully carried out. Application design is successfully carried out within 3 months of work, where the design has been carried out according to the needs of the user. The function of the system can run

as expected, where it can be proven based on the results of blackbox testing that has been carried out it can be concluded that the backend design of the Islamic crowdfunding application is 100% running well without any errors when run.

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