Research Paper

Architecture Application Model View Controller (Mvc) in Designing Information System of Msme Financial Report

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ABSTRACT: *The growth of micro, small and medium enterprises (MSMEs) has proven to be able to absorb labor force and further strengthen the innovation of small business developers. However, the growth of MSMEs is still experiencing difficulties in the development of its business related to capital. On the other hand, the channeling of capital is often stagnant because the channeling of capital does not have access to adequate information related to the condition of MSMEs. This is because the quality of MSME financial statements in Indonesia is still relatively low.*
With this problem, then in this research developed financial reporting information system (SILK) which is built with architecture model view controller (MVC). Application of MVC architecture in designing this extension can improve the modularity and reusability of the system. This is because the source code becomes more presentable and the separation between business logic and user interface is more explicit. With the MVC architecture, the complexity of the source code in the software can be significantly reduced, thus increasing the flexibility and modularity of the software system.
Keywords: View Controller Model (MVC), Financial Report, MSME, Information System

I. INTRODUCTION

Micro, small and medium enterprises are thriving in Indonesia, proven to be able to absorb labor and further strengthen the innovation of small business development. It can be seen through the development of SMEs throughout 2011 proved able to contribute the formation of GDP of 57.60%. The details are as follows, 32.02% by Micro Enterprise, 10.99% by Small Business, and 14.59% by Medium Enterprises. The average value of GDP formation by SMEs is Rp 24.8 million per business unit. UMKM is able to recruit 2.32 million new workers, equivalent to 97.8% of new employment created by SMEs and large enterprises in 2011. Absorption of new workforce is mostly done by Micro Enterprises, the number of 1.94 million people, including hiring himself. Small Enterprises are able to absorb a new workforce of 292,000 people [1]. However, the growth of MSMEs generally still experience various problems and not fully in line with expectations. The problem that until now is still a constraint in the development of SMEs business is the limited capital owned. This is because the capital structure of SMEs especially in Indonesia, almost largely based on personal investment. Very few, those who deal with third parties to get fund. If they need an injection of funds from outside parties, it is the parties other than banks, which is very important role. For example rural banks or even money lenders [2]. SMEs find it difficult to access capital resources because they have not been able to meet the requirements set by the finance institutions, especially in the case of bookkeeping. Issues management problems happen because in carrying out business activities often find difficulty in recording business operations. Many SMEs are more focused on operational activities so that recording and reporting are often overlooked. While without a good record and report performance evaluation of UMKM is not easy to do.

Capital constraints to develop the business, MSMEs basically have a great opportunity to get credit as a capital injection. Until now, many financing programs for MSMEs are run by the government, banking, BUMN and private parties. In its application, capital distribution is often stagnant because the channeling of capital does not have access to adequate information related to the condition of MSMEs. This is also supported by the quality of MSME financial statements in Indonesia is still relatively low. The low quality of the MSME report causes the quality of the financial statements to have no positive effect on the amount of credit it receives [3].

Recognizing the situation and conditions above, it takes an innovative utilization of information technology so that the perpetrators of SMEs most of them do not understand the accounting records to understand and easy to apply. So it is necessary to build an Automated Financial Report Information System with simple technology so that the perpetrators of MSME can easily prepare their own financial statements.

II.   DESIGN PATTERNS

A design pattern represents a proven solution to repetitive design problems, emphasizing the context and strength surrounding the problem, and the consequences and impact of the solution. There are many good reasons to use design patterns:
1. **Proven:** pattern design utilizes the experience, knowledge, and insight of developers who have used this pattern successfully in their work.
2. **Reusable**: If there is a problem, there is no need to find a new solution. Stay done with follow the pattern and adjust it as necessary.
3. **Expressive**: The design pattern provides a general vocabulary of solutions, which can be used to express a larger solution in a nutshell

III.   ARCHITECTURE VIEW CONTROLLER MODEL (MV)

The MVC architecture pattern divides an application interaction into three components. The model contains the functions and core data. View shows information to the user. The controller handles user input. View and controller are both composed of the user interface [4]. MVC follows the most common approach to Layering. Layering is just a logic that divides our code into functions into different classes. This approach is easily recognized and the most widely accepted. The main advantage of this approach is the reusability of the code.

The technical definition of the MVC architecture is divided into three layers [5]:
1. Model, The model used to manage information and notify observers when there is a change of information. The model is also a component used to retrieve data from a database/data source. The functions contained in the Model will be invoked by the Controller [6]. A model summarizes more than just the data and functions that operate within it. The model consists of classes that define the domains of interest. Objects owned by this domain often encapsulate data stored in the database, but also include code used to manipulate this data and enforce business rules. [7] Can be interpreted that the Model is the part that interacts with the database to handle data, logic and rules. [8] It not only captures the state of the process or the system but how the system works. For example, programmers can define models that bridge back-end computing with a GUI front-end (graphical user interface).
2. View, The view is the component responsible for presentation to the user [6]. Layer view is what is commonly called web design or templates. View controls how data is displayed and how users interact with it. View also provides a way of collecting data from users. The technologies that are primarily used in view are HTML, CSS, and JavaScript [9]. As a general rule, views should not contain application logic elements, so designers can work with them. This means logical blocks must be kept to a minimum [10].
The view usually has a 1-1 relationship with a screen surface and knows how to make it. View attaches to the model and renders its contents to the surface of the screen. Additionally, when the model changes, the view automatically redraws the affected part of the screen to indicate the change. There may be multiple views on the same model and each view can render the model contents to different display surfaces.
3. The Controller, Controller is a component that serves to call the function in the model and send the results through View, Controller also take input from the user which will then be processed by Model [6]. Thus, the controller is responsible for mapping the final user action against the application response. For example, when a user clicks a button or selects a menu item, the controller is responsible for determining how the application should respond. The controller sends commands to the model to update the data and also send commands to the view to modify the data received or displayed. When a request arrives on the server, the MVC framework sends it to a method in the controller based on URL [11].

Although MVC comes in many different types, control flow generally works as follows:
a) Users interact with the user interface in a certain way (eg, the user presses a button)
b) The controller handles the input event of the user interface, often via a registered handler or callback
c) Controller access model. Possible updating in a manner consistent with user actions (eg, controller updating user's shopping cart). Complex controllers are often structured using common patterns to encapsulate and simplify the extension.
d) A view using a model to produce the appropriate user interface (eg, view generates a screen that lists the contents of the shopping cart). The view gets its own from the model. Models have no direct knowledge of

the display. (However, observation patterns can be used to allow the model to indirectly inform interested stakeholders, potentially including views, changes)

e) User interface waits for user interaction, which initiates a new cycle.

IV.   INFORMATION SYSTEM

A system is a group of elements integrated with the same purpose to achieve a goal. Integrated elements mean different parts of utterly distinct that are unified into a roundness or totality [12]. Information is one of business resources, as well as raw materials, capital and labor, information is a vital resource for the survival of business organizations. Every day in business, large amounts of information flows to decision makers and other users to meet the various internal needs. In addition, information flows out of the organization to external users, such as customers, suppliers, and stakeholders who have an interest in the company. Information systems are processes that perform the functions of collecting, processing, storing, analyzing and disseminating information for a particular purpose [13]. So it can be concluded the information system is a series of formal procedures that run the function of collecting, processing, storing, analyzing and disseminating information to the user.

V.   FINANCIAL STATEMENTS

The financial statements are the records of the financial information of the company in the accounting period that describes the performance of the company. The financial statements are useful for bankers, creditors, owners, and interested parties in analyzing and interpreting financial performance and company conditions [14]. The purpose of the financial statements is to provide information on the financial position, financial performance, and cash flow statement of an entity that is beneficial to a large number of users in economic decision making by anyone not in a position to request special financial statements to meet specific information needs.

VI.   ANALYSIS AND DESIGN

Analysis

The analysis phase consists of several parts, namely the scope of the problem, the system's general description, software requirements specification, and system use cases. Creation of Financial Statement Information System (SILK). The main problem raised in making this application is to simplify the process of recording the operation and preparation of MSME financial statements. The process begins with the management of master data which is made for storage of data that is often used in operational. Furthermore, the system will receive input data purchase, production data, sales data and data payable or receivable payment. Until the system produces the income balance report according to the needs of the owner and the provider of capital.

Design

In the design section, there will be several parts, ranging from database design, interface and class design on programming. The design of the system architecture is done by applying MVC pattern. In the database design is done by designing a database consisting of tables in accordance with the needs, where the tables are mutually related. In the interface design is done a simple design with the aim that the forms produced easy to understand and operated by the user. In the system, the architecture will apply MVC pattern that aims to facilitate the process of evaluation and improvement and if possible the addition of features. The MVC form here will follow the pattern in the Code Igniter MVC used as the framework. The description of the MVC used in this system is shown in Fig1.
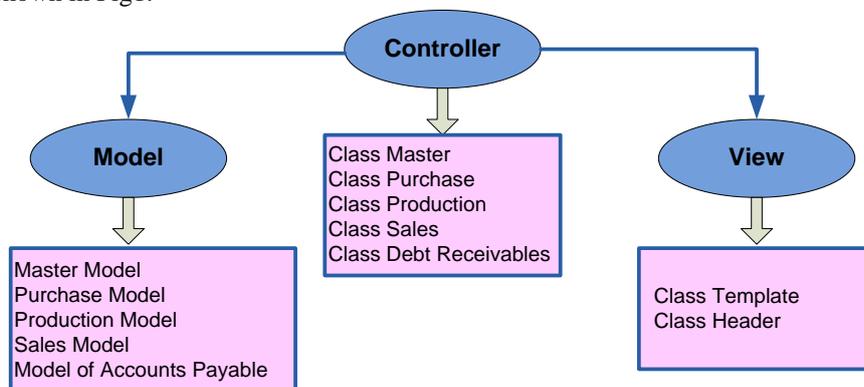
Figure 1. MVC model of SILK

VII.   IMPLEMENTATION

Implementation of MVC

Implementation of MVC is demonstrated by the use of the CI framework for workstations. In the CI workspace file for each model, the view and controller will have a separate section. Its use by grouping each MVC file into separate folders and for each main module 1 MVC form is created respectively. With a pattern like this will make it easier to do the workmanship and improvements on certain modules. Modules contained in this system is divided into 4 main parts, namely the purchase module to handle the purchase process starting from purchase orders, purchases and purchase returns; production module to handle the needs of the production process by taking into account the quantifier of raw materials and the quantifier of their products; sales module to handle sales orders, sales and sales reorders; as well as debt payable module for the purposes of recording the flow of debts and accounts receivable. Each of the modules is created 1 each MVC form.

Interface Implementation

Figure 2. Form Master of Goods

Figur 3. Form for Purchase Entry

VIII.   TESTING

In this section, we describe the test scenarios used. Where the testing is done functional requirements testing system. SILK testing is conducted with the aim to know the suitability of the functions or services of the system implemented with the analysis of needs that have been determined at the stage of functional and nonfunctional requirements analysis. The test method is white box testing and black box testing. White box testing is a test performed on the internal system and focused on the discovery of structural error program codes or programming logic as long as the software is built. White box testing will not be explained because the test has been done simultaneously with the system development process.

Black box testing is a test focused on the functional requirements or the correctness of the input and output resulting from the software being built. Black box testing will be done by giving input from the user to the system that has been running and observe the output of the system. The test will be performed in each use case to determine the suitability of the function of the system.

The test procedure performed in the testing process of the SILK system is as shown in the section below:
1. Determine the data to be used for software testing purposes.
2. Determine the test method and evaluation criteria for the test results for each use case in the system.
3. Perform testing for each use case by using pre-prepared data and comparing the results with the test result criteria.

Based on the test results and the results obtained from the function of each use case can be concluded that the application of model-view-controller architecture (MVC) in the design of this SILK was declared successful.

IX.   CONCLUSION

The result of this research is an application of financial report information system (SILK) for MSME by applying MVC architecture. The research can be concluded that:
1. SILK application can accommodate SMEs in conducting their operational records and can provide financial reports as needed creditor more easily and quickly.
2. Application of MVC architecture in designing this extension can improve the modularity and reusability of the system. This is because the source code becomes more presentable and the separation between business logic and user interface is more explicit.
3. With the MVC architecture, the complexity of the source code in the software can be significantly reduced, thus increasing the flexibility and modularity of the software system

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