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# Zim Ventures Management System

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**Abstract**: Zim Ventures Enterprise is a company based in Plentong, Johor that still manually manages all relevant information such as project information and sub-contractor information. However, this manual method for maintaining all related information is time-consuming since project-related documents are kept manually. Therefore, a web-based management system is proposed to minimize the difficulties of tracking projects progression and management in Zim Ventures Enterprise. Meanwhile, the object-oriented approach was used to develop this project using a Waterfall model which includes requirement phase, design phase, development phase, testing phase and maintenance phase. The MySQL database is used in the design of this proposed system. PHP and HTML are the programming languages used. In general, the Zim Ventures Management System is designed to improve the efficiency and effectiveness in managing the data of Zim Ventures Enterprise.

**Keywords**: Management System, Web-Based System, Contractor

## 1. Introduction

This project is to develop Zim Ventures Management System which is a system that can manage and retrieve all information related to Zim Ventures company in which it will be handled by the manager and staff of Zim Ventures company. Information such as project information and accounting information e.g., quotation, invoice and report will be stored effectively in the system. The existing data handling process of management system that is used by Zim Ventures company is they would use Microsoft Excel and Microsoft Word for handling and storing details of paperwork like quotation and invoice. Besides, the staff or manager of Zim Ventures company would have to search all documents that have been placed in a drawer if they wanted to retrieve data back. Other than that, documents used in the company are accounting documents like quotation and invoice. They would also use WhatsApp application to track the progression of the project. The current method that Zim Ventures company has been using since its establishment of the company has resulted in some problems. One of the problems encountered is it takes some time to create accounting documents because Microsoft Word and Microsoft Excel do not have suitable features for documents like quotation. This makes the staff perform tasks such as creating invoices in a slow and inefficient manner. The process of keeping all these data is time-consuming since all records are managed manually [1]. Besides, the problem faced

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when the staff wants to retrieve data by searching documents in a drawer is data inconsistency might be going to happen because some of the documents are being kept in a drawer after they have been categorized but the rest of the files are stored in a computer [2]. Lastly, WhatsApp application that has been used by the company to track the progression creates issues like communication issue [3].

The project's objective is to design a management system using an object-oriented approach. The second and third objectives are to develop and test the Zim Ventures Management System. The study domain of Zim Ventures Management System is about the online management system. This project is mainly focused Zim Ventures company which located in Plentong, Johor and since this system will only be used by Zim Ventures company, the individuals involved in information retrieval process for this project are only the staff of Zim Ventures company. Therefore, it is obvious that the system user list includes only the Zim Ventures company staff and manager. The staff can use it to manage the project systematically and it also can smooth the way for the staff to obtain project information. Hence, in order to produce such a system, several system function modules will be used such as user login, dashboard, manage project, manage sub- contractor, manage quotation and invoice, manage user profile and data, and lastly manage report. Zim Ventures Management System will have some features that allow the user to create, update or view the data of project, subcon and accounting document efficiently. Other than that, the performance of the system is guaranteed to be performed in a high performance and faster data access which means it enhances access to the data while dealing with large amounts of data that will ease the job of the staff. Besides, the system can provide several types of report by monthly or yearly such as project reports and subcon report. Lastly, this system enables the user to secure all the documents in one better platform to minimize data inconsistency that will be likely to happen.

## 2. Literature Review

### 2.1 Existing Management System of Zim Ventures Company

This project was conducted at Zim Ventures Company, which is managed by a contractor, Mr. Hazim. Currently, documents, quotations and invoices at Zim Ventures Company are done manually. Microsoft Excel and Microsoft Word are used to keep track of their records. It is impossible to save all data for an extended period of time, particularly if the system was utilized for several purposes. There is a considerable likelihood of duplication, inaccuracy, and omission. There are various causes of poor management and will highlight a few of the ones that Zim Ventures Company used, the most significant of which is manually tracking project progress using the WhatsApp application. This is a waste of time and increases the probability of making mistakes.

### 2.2 Web-Based System

Currently, all information is exchanged directly between participants. The participants maintain their own files including the necessary information. This traditional method of communication is often time-consuming. The construction involves a large number of workers [4]. This increases the complexity of their relationship. The process of communicating information becomes difficult and inefficient.

A web-based system is any program that is accessible via an Internet connection rather than being in a computer's memory. The information system stores documentation, review record and operational data. Documents can be added to web-based applications utilizing Internet standards [5]. The sharing and exchange of documents is at the basis of any web-based project management system. These data can be saved in a centralized database for users to monitor, view, and modify as needed. Therefore, the web-based management system plays an important role in improving the construction industry.

### 2.3 Study of Existing Related Systems

The system to be developed is the Zim Ventures Management System. Based on a review of the three existing systems, a variety of functions have been studied in order to be used as a guide so that the development of the system can be built as well as possible. Throughout the studies, it was found that there are some advantages and disadvantages present in the systems. Table 1 shows a comparison of the existing systems, namely, Contractor Foreman [6], Odoo [7], Xero [8], and Zim Ventures Management System.

**Table 1: System's Comparison**

| Features/System | Contractor Foreman | Xero | Odoo | Zim Ventures Management System |
|---|---|---|---|---|
| Login | Yes | Yes | Yes | Yes |
| Dashboard | Yes | Yes | Yes | Yes |
| Manage Project | Yes | Yes | No | Yes |
| Manage sub-contractor | No | No | No | Yes |
| Manage Document | Yes | Yes | Yes | Yes |
| Manage User Profile | Yes. | Yes | Yes | Yes |
| Manage Report | Yes | Yes | Yes | Yes |

From the table above, it can be seen that there are several modules of the proposed system that are the same as the existing system. Among the weaknesses of the existing systems is that most of them do not provide a manage sub-contractor module and some systems do not provide manage project module. Hence, the system to be built will provide both modules for the convenience of manager and staff in managing the data of project and sub-contractor.

## 3. Methodology

The Zim Ventures Management System development process is based on a waterfall model. This waterfall model includes several important phases such as requirement phase, design phase, development phase, testing phase and maintenance phase. Table 2 below represents the activities that have been and are being carried out throughout the specified time period. Each phase involved has its own activities and tasks to deliver the required results throughout the system. Figure 2 shows the waterfall model from requirement phase to maintenance phase.

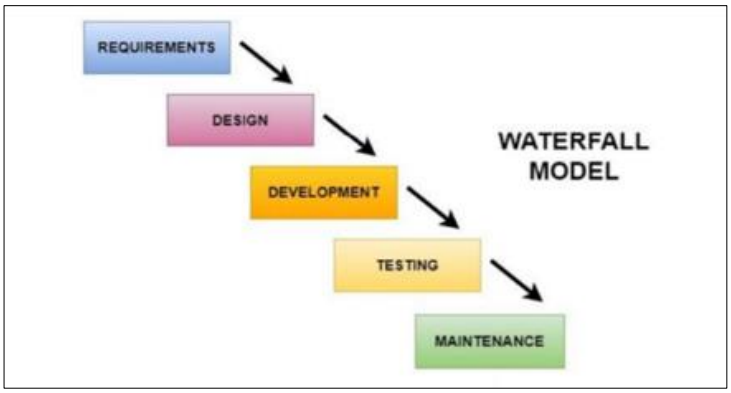


**Figure 1: Waterfall model [9]**

**Table 2 : Software Development Activities**

| Phase | Task | Output |
|---|---|---|
| Requirement | • Proposed the project<br>• Determine the project schedule, activities, and output<br>• Collect user requirements | • Proposal of Zim Ventures Management System<br>• Develop Gantt chart |
| Design | • Design the interface of website<br>• Design module<br>• Identify software and hardware requirement | • Designed interface<br>• Project Requirement |
| Implementation | • Develop the interface of system<br>• Develop code for system<br>• Developed database | • Developed interface<br>• Developed database |
| Testing | • Perform user acceptance testing<br>• Conduct Testing | • Test plan<br>• Test cases<br>• User Feedback |
| Maintenance | • Fixing error<br>• Collect errors and defects list | • Updated system |

A requirement is a statement that describes the functionality of a system that is to be built by covering various aspects clearly and decisively [10]. Therefore, identifying requirements is a very important step that needs to be emphasized in developing any new system. Table 3 shows the functional requirement of Zim Ventures Management System.

**Table 3: Functional requirements of Zim Ventures Management System**

| No | Modules | Description |
|---|---|---|
| 1 | Login module | • The system should allow user to login using username and password<br>• The system should only allow a user to log in as a user with a valid username and password<br>• The system should alert the user of any invalid input<br>• The system should redirect the user to that respective main menu upon successful login |
| 2 | Dashboard module | • The system should allow the user to view all available project progression |
| 3 | Project module | • The system should allow the user to create new project<br>• The system should allow the user to edit the information about the project |

| No | Modules | Description |
|---|---|---|
| | | • The system should allow the user to delete the progression of the project<br>• The system should allow the user to view progression of the project |
| 4 | Sub-contractor module | • The system should allow the user to create new sub-contractor<br>• The system should allow the user to edit sub-contractor detail<br>• The system should allow the user to delete project to sub-contractor<br>• The system should allow the user to review sub-contractor<br>• The system should allow the user to view sub-contractor |
| 5 | Accounting document module | • The system should allow the user to create new accounting document<br>• The system should allow the user to edit accounting document<br>• The system should allow the user to delete accounting document<br>• The system should allow the user to view accounting document |
| 6 | User profile module | • The system should allow the user to create new user profile<br>• The system should allow the user to edit user profile<br>• The system should allow the user to delete user profile<br>• The system should allow the user to view user profile |
| 7 | Report module | • The system should allow the user to view monthly/ yearly report<br>• The system should allow the user to view project report<br>• The system should allow the user to print report |

Non-functional requirements are about the constraints that exist in a system. Five non-functional requirements will be implemented in this proposed system. Hence, the non-functional requirements and the description of the proposed system are listed in Table 4.

**Table 4: Non-Functional requirements of Zim Ventures Management System**

| No | Requirements | Description |
|---|---|---|
| 1 | Availability | • The system should always readily operable and readily accessible for use. |
| 2 | Usability | • The user interfaces should be simple for users of any technical background to learn and use. |
| 3 | Security and Privacy | • The system can only be accessed by valid users at any time. |
| 4 | Operational | • The system should be able to be used in any web browser |
| 5 | Performance | • The operation time and response time of the operating system should be assumed to be acceptable. |

## 3.1 Use Case Diagram

The use case diagram was created as part of the study to highlight the function of the system. It provides the system analysis methodology used to define, clarify, and organize the system requirements of the Zim Ventures Management System. In addition, the use case diagram is also applied in UML (Unified Modeling Language) as a modeling of real-world objects and systems. The identified actors or users are the manager and staff who carry out the various types of use cases. The interaction between the actor and its functions for the proposed system is shown in Figure 2 below.

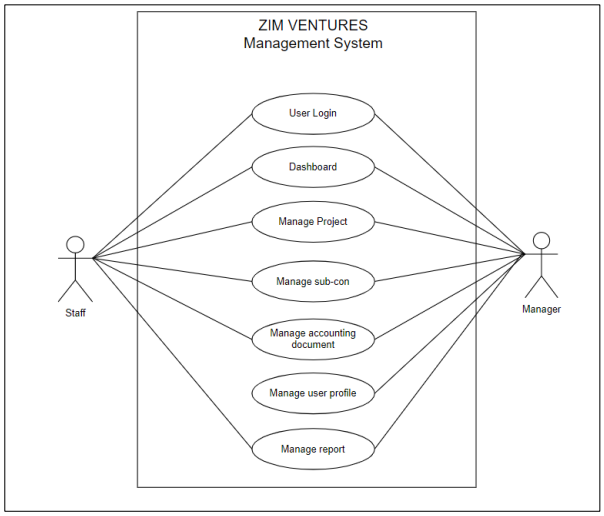


**Figure 2 : Use Case Diagram**

## 3.2 Class Diagram

The class diagram is created to support developing code for the system development. The class diagram includes the class name, attributes, and the class relationship. The class diagram is based on object-oriented concepts as shown in Figure 3. As a result, class diagrams are an important element for this system development. Therefore, the class diagram will further explain the class name, attribute list, function list as well as the type of relationships involved in the development of the Zim Ventures management system.

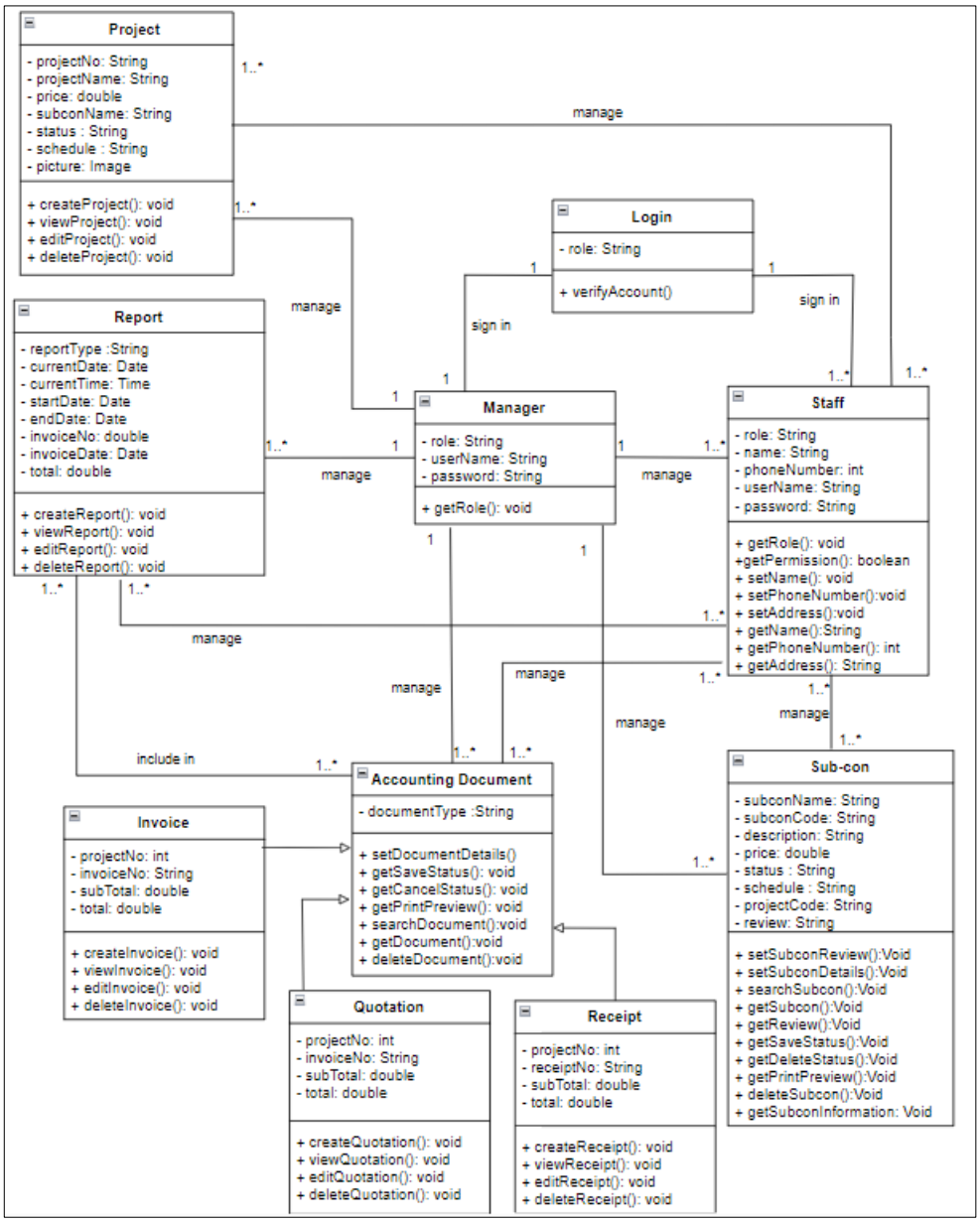


**Figure 3 : Class Diagram**

## 4. Results and Discussion

### 4.1 System Implementation

The implementation of the Zim Ventures Management System based on the web portal has been implemented according to the module described in the previous chapter. This web-based system was developed using Visual Studio Code while the database management used MySQL Database to manage the data.

In order to use the function of Zim Ventures Management System, the manager needs to log in to the account by entering a valid username and password. An error message will be displayed on this page if the user enters an username or password incorrectly into the provided input text field. Figure 4 shows the Login page for the Zim Ventures Management System web portal.

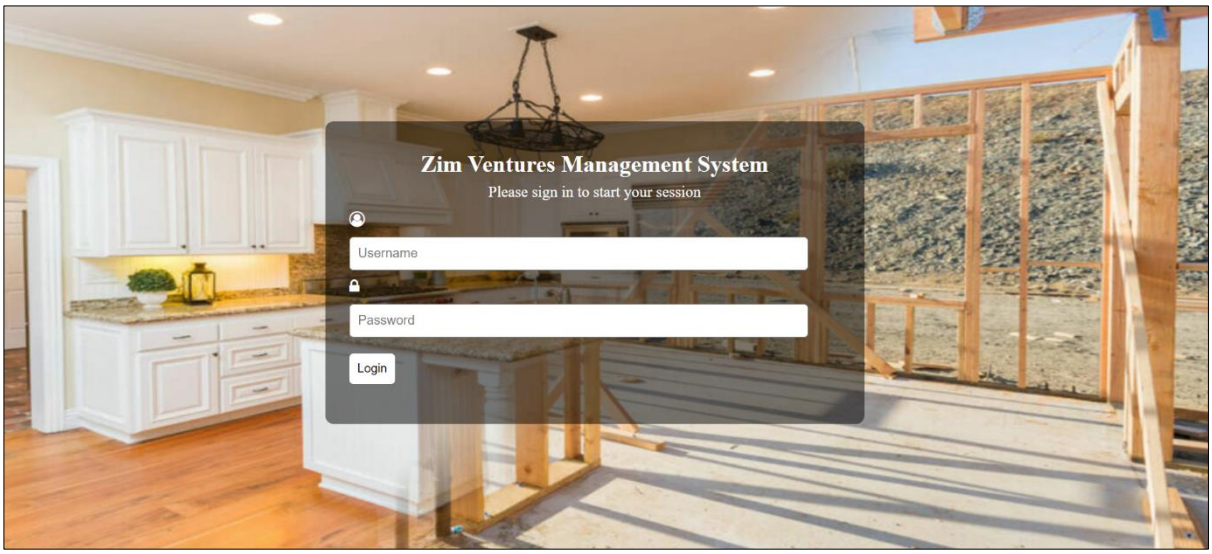


**Figure 4 : Login page of Zim Ventures Management System**

Once Zim Ventures Management System's users have successfully logged in on the previous page, they will automatically be displayed on this page. On this page, there are several boxes that represent some important modules found in the system. The purpose of these box options is to make it easier for users to control and check important modules such as Total Projects, Total In Progress Projects, Total Documents and Total Sub-contractors. Figure 5 shows the dashboard of Zim Ventures Management System. Also, this page will show progression of in progress projects.

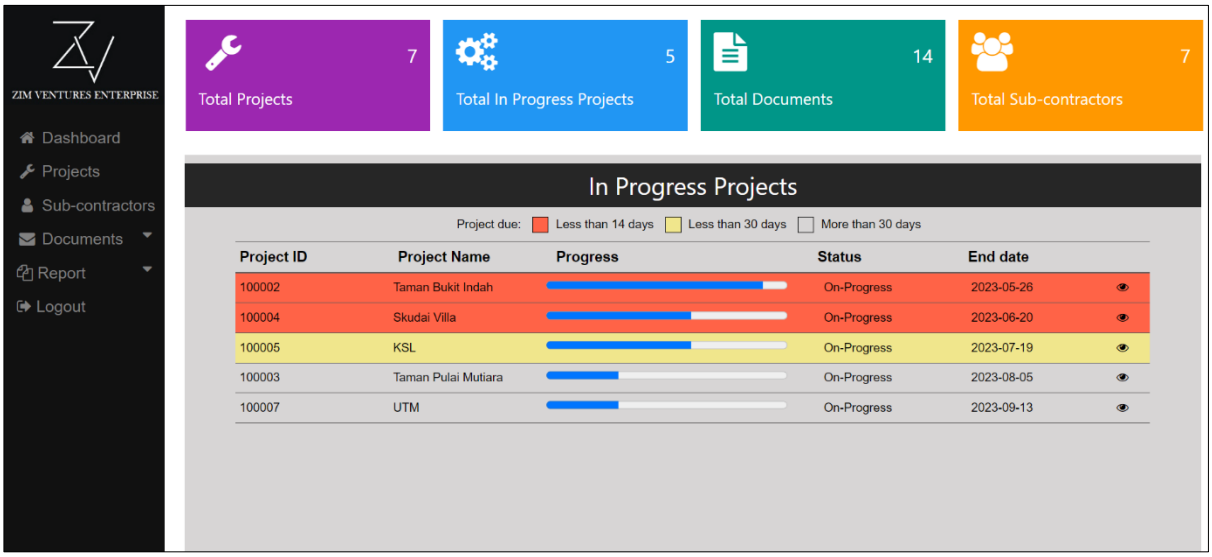


**Figure 5 : Dashboard of Zim Ventures Management System**

Figure 6 and Figure 7 show the interface of the project page and sub-contractor page respectively. These pages will be used by both the manager and staff to manage all projects and subcontractors of Zim Ventures. The user can create a new project or subcontractor into the system. Also, they can update and view the available project or subcontractor details. All details are stored in the database. The update process can be done by pressing the icon "Pencil" while the process of deleting information from the database can be done by pressing the "Trash Bin" icon found in the action column. Besides, the review subcontractor process can be done by pressing "Thumbs up" icon. A red color bar indicates that the project duration is less than two weeks from the project end date while a project with a yellow bar indicates that the project has less than one month from the project end date.

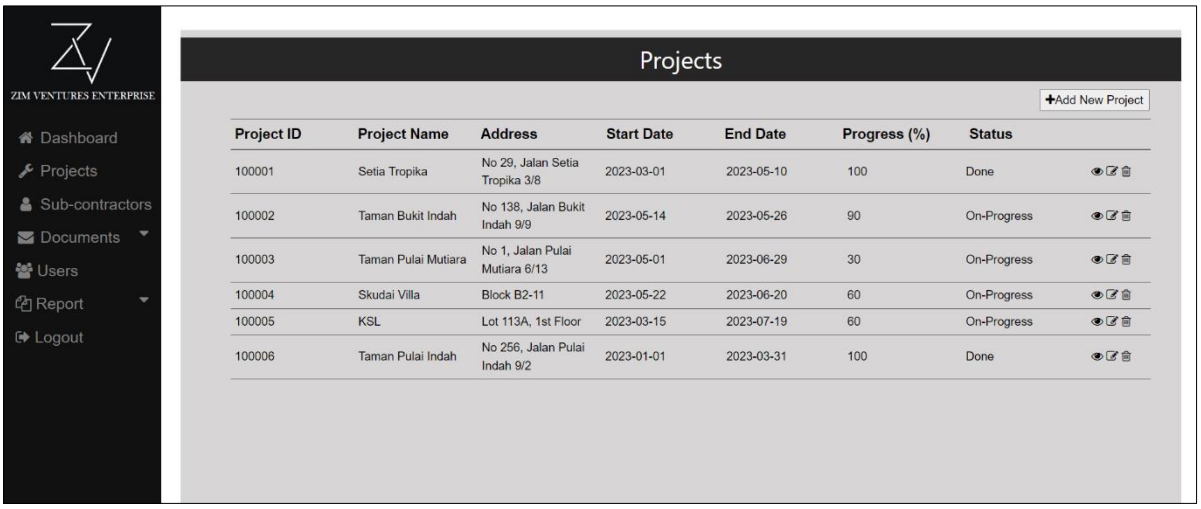


**Figure 6 : Project Page Interface**

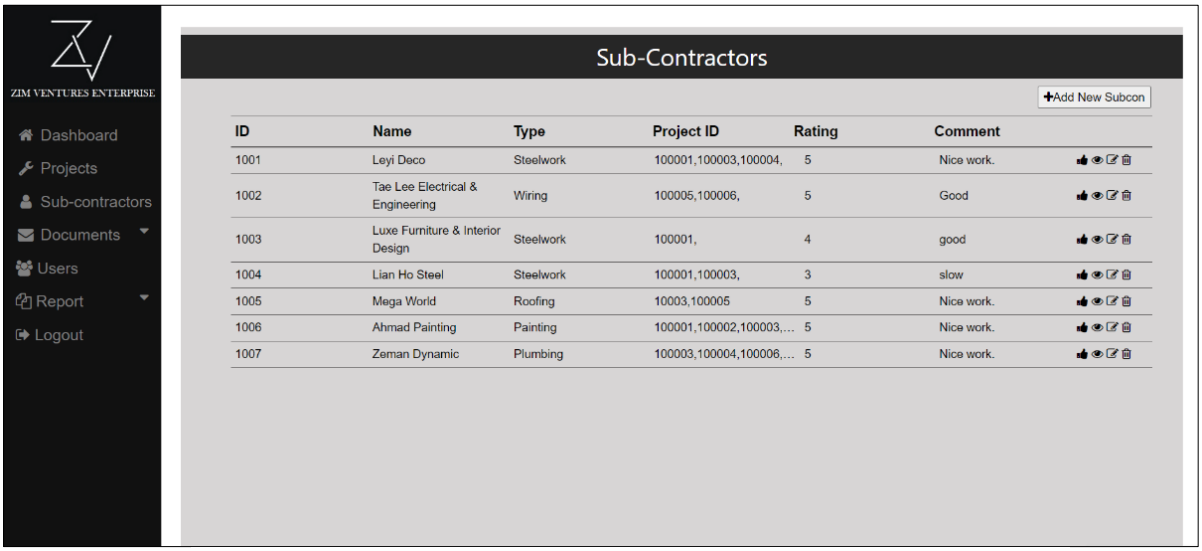


**Figure 7 : Sub-contractor Page Interface**

Next, Zim Ventures Management System can create three different types of accounting documents which include quotation, invoice, and receipt. Users can perform create, update, view and delete actions on the corresponding document page. Figure 8 shows the invoices that are created from the Zim Ventures Management System. Users also can perform print document action by pressing the “Print” button.

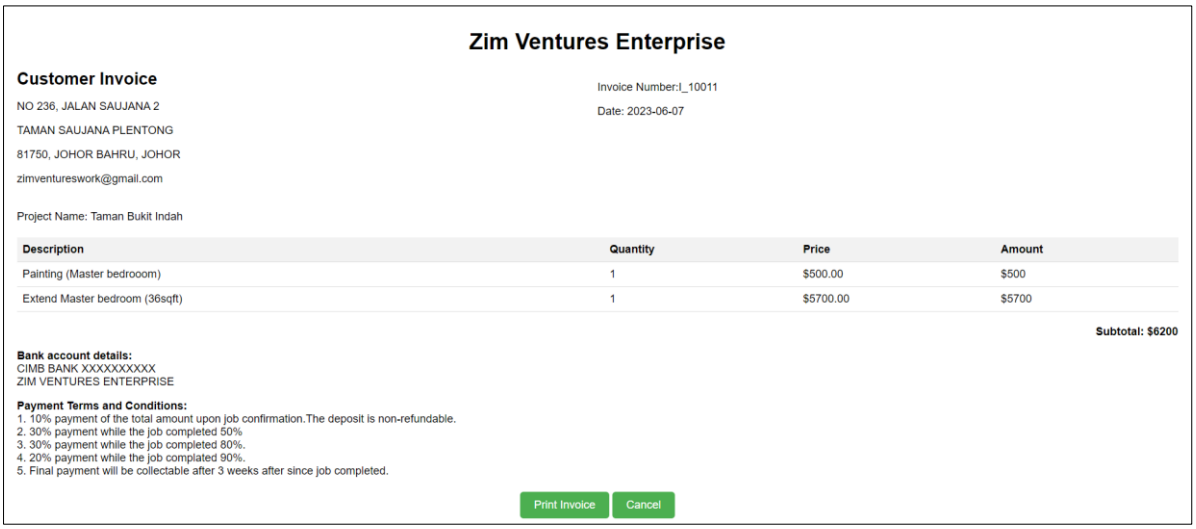


**Figure 8 : Invoice**

Furthermore, this page is used by Zim Ventures manager. Here, the manager will create a new user to give Zim Ventures staff access to log into the Zim Ventures Management System. Since only manager have access to user profile functions, therefore, only manager can update user details such as passwords. The system will allow the manager to update and delete user information by pressing the icon provided. Figure 9 shows the user page of Zim Ventures Management System.

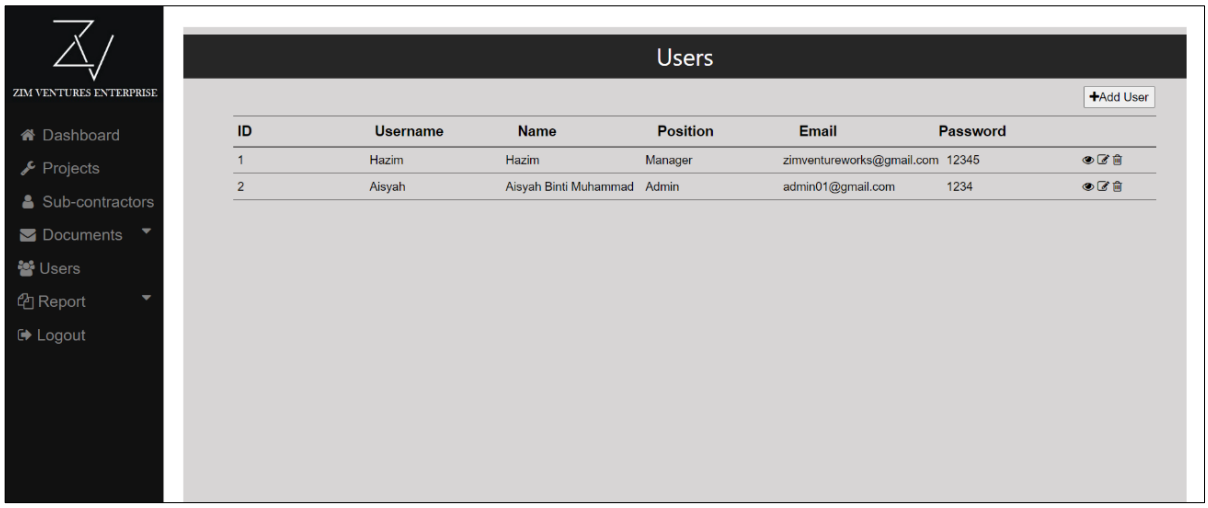


**Figure 9 : User Page Interface**

Lastly, on the Report page, the manager or staff will be displayed with a record of the entire projects by year represented by a chart. Figure 10 shows the entire page of the Zim Ventures Report.

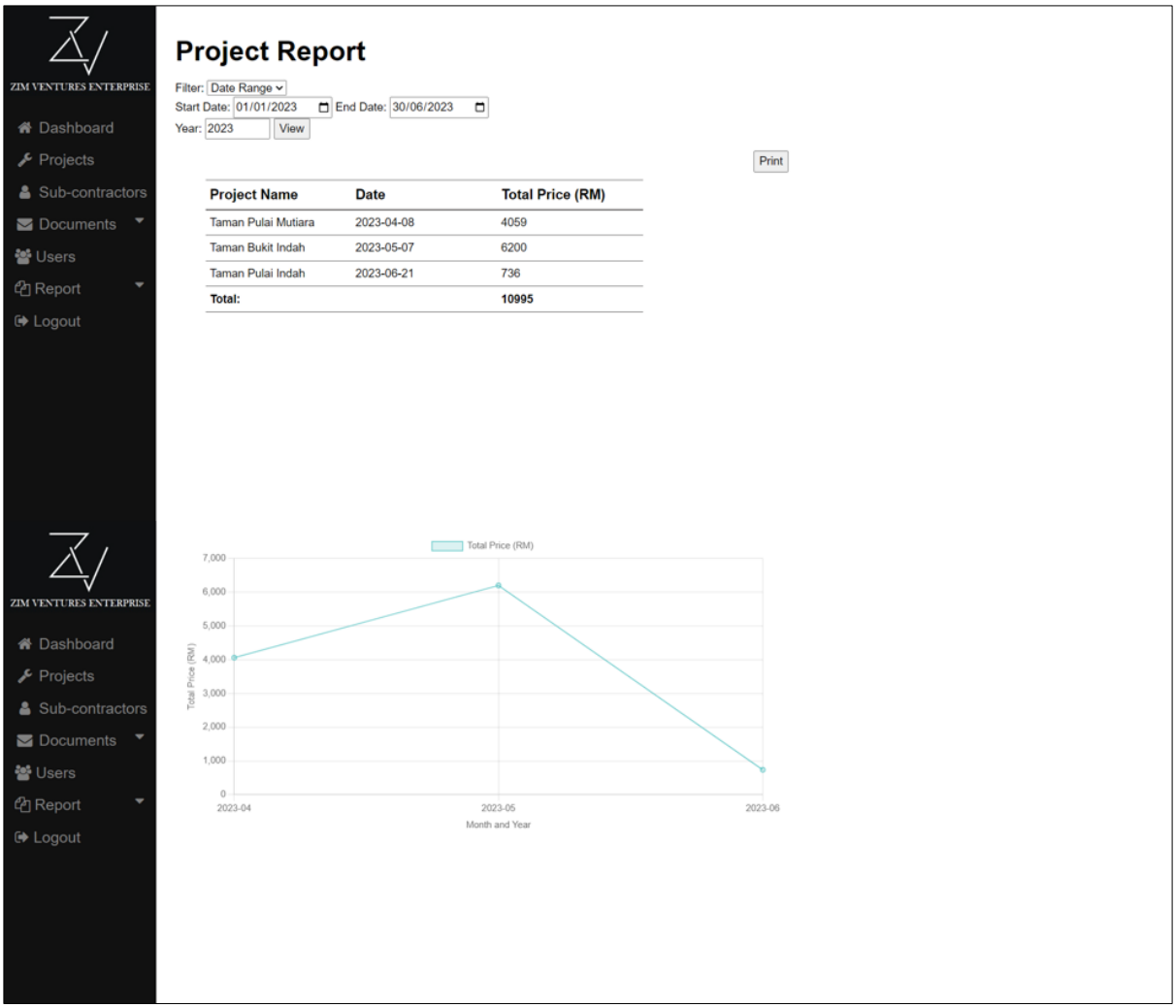


**Figure 10 : Report Page Interface**

## 4.2 System Testing

Testing is done as soon as the system is developed. This testing serves as a process of evaluating and verifying the developed system to identify whether the system has achieved the project objectives or not. If there are any known errors during the testing process, the system needs to be repaired until it achieves the purpose of the project. System testing works to ensure that the design and smoothness of a system can be achieved. In order to ensure that this project runs smoothly and in an orderly manner, usability tests and user acceptance tests have been conducted on Zim Ventures Management System to identify the strengths and weaknesses of the system to be developed. Table 5 shows the user acceptance test results based on the Zim Ventures Management System module.

**Table 5 : User Acceptance Test Results**

| No. | Test Case | Description | Expected Result | Result |
|---|---|---|---|---|
| 1 | STD_TEST_100_001 (Login module) | Enter valid username and password. | Users can log in and be directed to dashboard page | PASS |

| No. | Test Case | Description | Expected Result | Result |
|---|---|---|---|---|
| | | Enter wrong username and password. | Users cannot log in | PASS |
| | | Left the input field blank | System prompt input required | PASS |
| No. | Test Case | Description | Expected Result | Result |
| 2 | STD_TEST_200 (Dashboard module) | View active project list | Users can view the active project list | PASS |
| 3 | STD_TEST_300 (Manage project module) | View all project list | Users can view all project list | PASS |
| | | Enter valid project details | System prompt " Project created successfully" and project information will be stored in the database. | PASS |
| | | Left the input field blank | System prompt input required | PASS |
| | | Update project details | Project information will be stored in the database. | PASS |
| | | Delete project from system | Project information will be deleted from database. | PASS |
| 4 | STD_TEST_400 (Manage sub-contractor module) | View all sub-contractor list | Users can view all sub-contractor list | PASS |
| | | Enter valid sub-contractor details | System prompt " Sub-contractor created successfully" and sub-contractor information will be stored in the database. | PASS |
| | | Left the input field blank | System prompt input required | PASS |
| | | Update sub-contractor details | Sub-contractor information will be stored in the database. | PASS |
| | | Delete sub-contractor from system | Sub-contractor information will be deleted from database. | PASS |
| | | Enter valid review information | System prompt " Sub-contractor reviewed | PASS |

| No. | Test Case | Description | Expected Result | Result |
|---|---|---|---|---|
| | | | successfully" and review information will be stored in the database. | |
| 5 | STD_TEST_500 (Manage accounting document module) | View all accounting document list | Users can view all accounting document list | PASS |
| | | Enter valid document details | System prompt "Document created successfully" and document information will be stored in the database. | PASS |
| | | Left the input field blank | System prompt input required | PASS |
| | | Update document details | Document information will be stored in the database. | PASS |
| | | Delete document from system | Document information will be deleted from database. | PASS |
| 6 | STD_TEST_600 (Manage user profile module) | View the latest user list | User can view the user list | PASS |
| | | Enter valid user details | System prompt "User created successfully" and user information will be stored in the database. | PASS |
| | | Left the input field blank | System prompt input required | PASS |
| | | Update document details | User information will be stored in the database. | PASS |
| | | Delete user from system | User information will be deleted from database. | PASS |
| 7 | STD_TEST_700 (Manage report module) | View the overall report by month/year | User can view the report. | PASS |

Table 6 shows a summary of system test results by test case. There are 26 test cases that have been carried out to test the Zim Ventures Management System. The result shows that the system passes for all the test cases. This test is based on the modules available in the system which are the Login module, Dashboard module, Manage project module, Manage sub-contractor module, Manage accounting document module, Manage user profile module, and Manage report module. In order to get accurate

results, this test was done together with the Manager of Zim Ventures, Mr. Hazim and staff of Zim Ventures.

**Table 6 : Summary of System Testing Results**

| No | Test Case | Number Of Passed Test Cases | Pass (%) |
|---|---|---|---|
| 1 | STD_TEST_100 | 3/3 | 100 |
| 2 | STD_TEST_200 | 1/1 | 100 |
| 3 | STD_TEST_300 | 5/5 | 100 |
| 4 | STD_TEST_400 | 6/6 | 100 |
| 5 | STD_TEST_500 | 5/5 | 100 |
| 6 | STD_TEST_600 | 5/5 | 100 |
| 7 | STD_TEST_700 | 1/1 | 100 |
| | TOTAL | 26/26 | 100 |

### 4.3 User Acceptance Testing

Figure 11 shows user acceptance testing which has been illustrated in the form of a bar chart. The following results have been obtained after the system testing done with the manager of Zim Ventures, Mr. Hazim and staff of Zim Ventures, was completed. In summary, all modules have been successfully tested and implemented successfully.

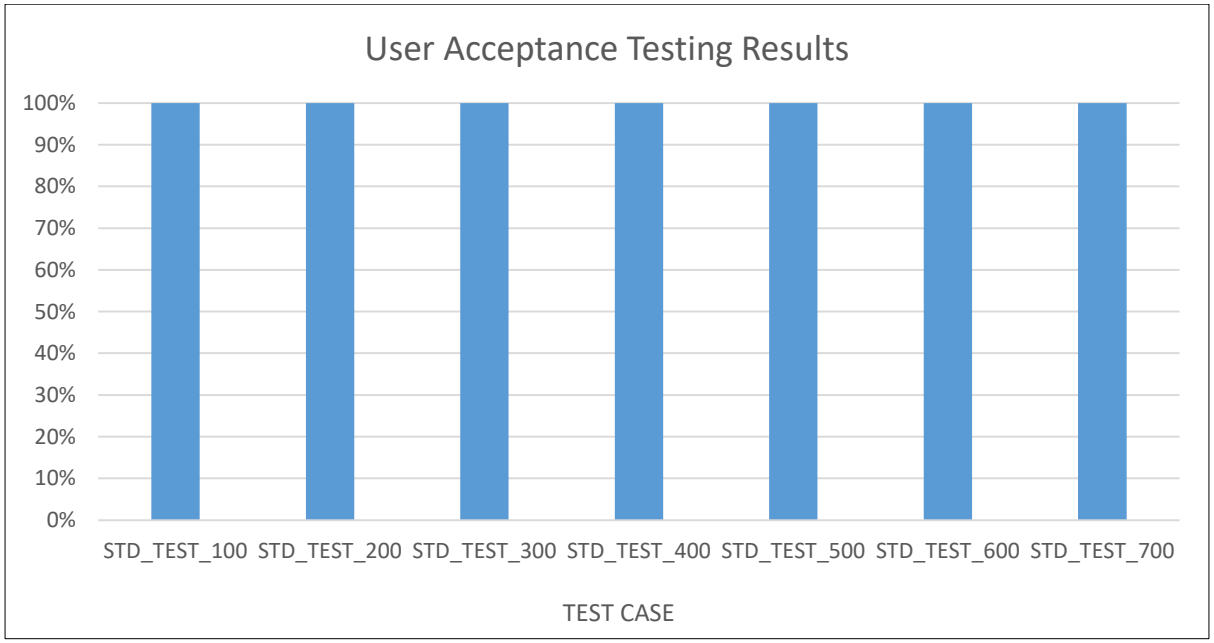


**Figure 11 : User Acceptance Testing Results**

## 5. Conclusion

The absence of a platform that can manage the project-related information of Zim Ventures Enterprise causes the staff and manager to rely entirely on a manual system that is by using paper, Microsoft Excel, and Microsoft Word. The results of the interview found that this existing method is less effective. Therefore, the Zim Ventures Management System was developed to overcome this

problem. A comparative study of the existing system has also been done to obtain information about the web-based management system. The results of the study found that the existence of management system in Zim Ventures Enterprise will definitely have a positive impact, especially in terms of managing project information, thereby strengthening the achievement of project objectives. Even so, improvements can still be made to the proposed system. Among the suggested improvements that have been identified include introducing an alert feature to all Zim Ventures Management System users regarding any updated information. This project is considered beneficial for the Zim Ventures Management System in further improving its effectiveness.

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