SOFTWARE ENGINEERING

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I. INTRODUCTION

SMEs play a vital role in generating vast amounts of nation’s revenue this day to the development of websites to support business transactions.Digital Technology Adoption and Incubator program both for small business and enterpreneur . Despite the great attention by the government, the e-commerce adoption by SMEs in Indonesia is still far behind the adoption by large companies . This disparity also occures in other developing countries. The main cause of this problem is SMEs have not ready yet to adopt technology categorized by echnological factors, organizational factors, environmental factors and individual factors . When developing an information system, one of the things that is difficult to predict is the system requirements. This is because system requirements can change to suit user needs or changes in the system's operational environment. Success in adapting to change is a determinant of the success of system development. Agile is a methodology that is considered suitable for system development whose requirements specifications change during the development phase . As one of the Agile methods, Scrum is considered suitable to be used because it can accommodate both of these things. The adoption of Scrum as a software development method in MSMEs has proven to be able to produce information systems that work well and in accordance with organizational needs .

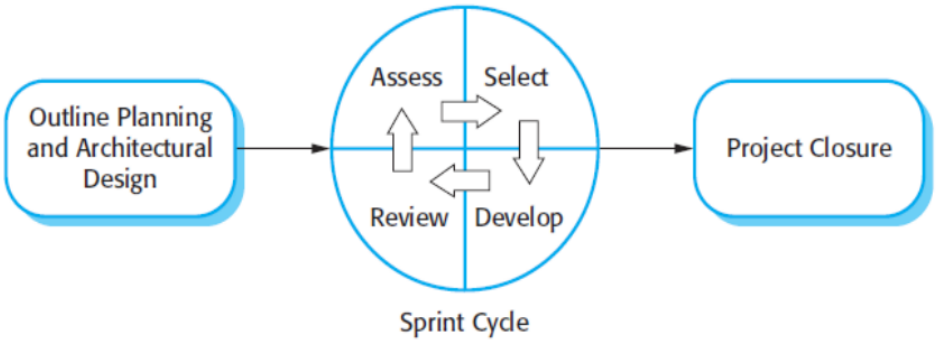


Fig. 1. Scrum method

Scrum method

Based on the above background, this study aims to develop an e-commerce website that can be used to introduce stores, manage products sold and manage customer orders. With this website, the benefit that customers get is the convenience of customers to view and order products. Meanwhile, for business owners, it is an increased opportunity to be known by potential customers while providing better service to them so that in the end it will have an impact on increasing sales

II. METHOD

A. Outline Planning & Architectural Design

At this stage the general objectives of the project and software architecture are created. Specifically, what is being done is making user stories and product backlogs. The user story contains a description of the software requirements. Next, a product backlog is created from the previously compiled user story. Each product backlog is given a weight and priority level using the Fibonacci numbers, namely 3, 5, 8, and 13 with the number 3 representing small, medium, large and very large weights, respectively. While the priority level uses a small, medium, and large scale. The system is designed using UML (Unified Modeling Language) . The modeling used is Use Case Diagram. In addition, to describe the required entities, a database design is made. Database design is also done to define the data involved in the system

B. Sprint Cycle

The sprint cycle is carried out until all product backlogs have been created. Each cycle has a duration of 1 week. The stages in the sprint cycle are as follows:

1. Sprint planning, which is to determine the sprint backlog which is the product backlog that will be carried out in the sprint. The selection criteria are in the form of priority level, workload and functional linkages between product backlogs.

2. System development, namely making a system design based on the CSS (Cascading Style Sheet) framework. Next, code the application with PHP, HTML, JavaScript and Flash languages.

3. Testing, namely functional testing of the system that has been developed.

4. Sprint review, which is a demonstration of the results of the related sprint to stakeholders. The feedback obtained will become a new product backlog that will be worked on in the next sprint.

5. Deployment, namely the submission of system functionality that was completed in a sprint and did not change during testing and sprint review to stakeholders.

III. RESULT

A. User Stories User stories contain the categories of system users and the functional requirements of the system and are created in a common user language. The format for writing user stories in this study is as , and I want . In the system created there are two main users, namely: administrator and customer. Here are the user stories of each system user:

1. Administrator user stories:

• As an Administrator, I want to manage product data, in the form of adding, changing and deleting.

• As an Administrator, I want to manage promo data, in the form of adding, changing and deleting.

• As an Administrator, I want to manage customer data, in the form of adding, changing and deleting.

• As an Administrator, I want to see the data of orders/purchases by customers.

• As Administrator, I would like to confirm the payment made by the customer.

• As an Administrator, I would like to print or download a proof of payment for a product.

• As an Administrator, I want to update the purchase order progress.

• As an Administrator, I want to view sales reports.

2. Customer user stories:

• As a Customer, I want to register as a customer and change my personal data

• As a Customer, I would like to see a list of products.

• As a Customer, I want to manage my shopping cart, in the form of adding, changing and deleting. • As a Customer, I would like to checkout a purchase.

• As a Customer, I would like to obtain a receipt/proof of payment. • As a Customer, I would like to confirm a payment.

• As a Customer, I want to know the rate at which orders are being placed.

• As a Customer, I want to see my purchase history.

B. Product Backlogs

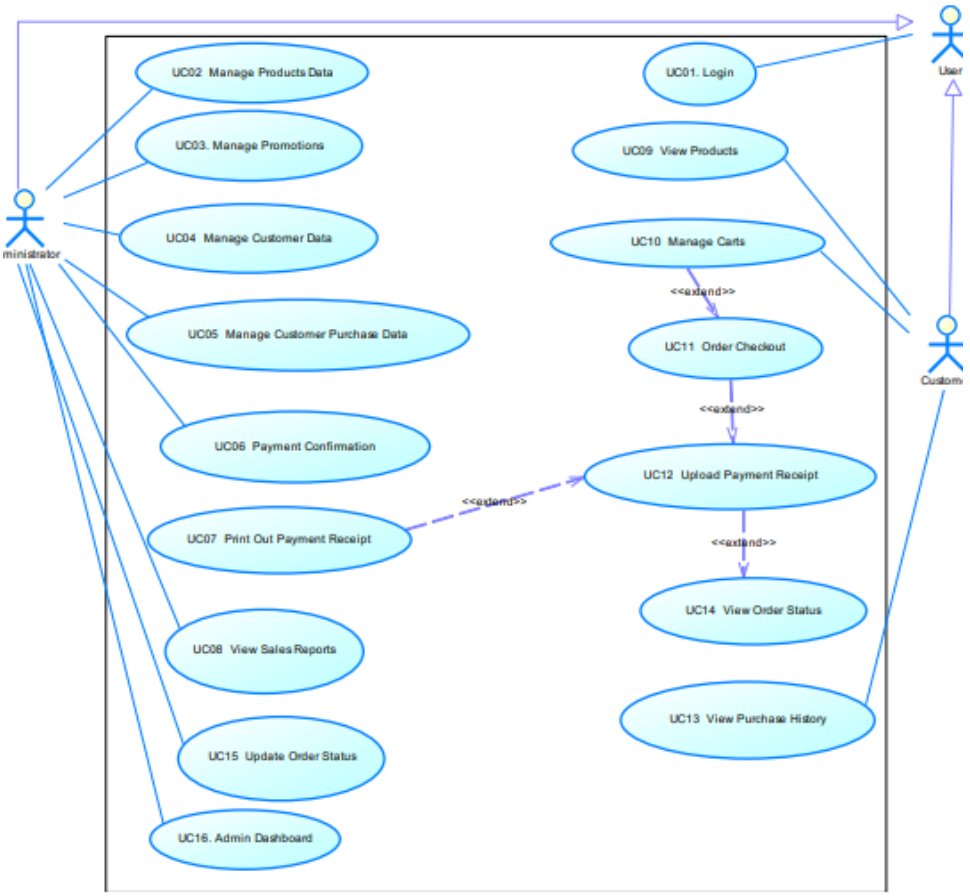
The product backlog contains the features to be developed along with the priority level and workload.

Based on user stories, the product backlog is divided into two according to the category of system users. The product backlog for administrators can be seen

Administrator Product Backlog			
Num	***Feature***	***Weight***	***Priority***
1	Login	5	*Large*
2	Managing products data	8	*Large*
3	Managing promotions	8	*Large*
4	Managing customer data	5	*Medium*
5	Managing customer purchase data	5	*Large*
6	Confirm payment by customer	5	*Large*
7	Printing payment receipt	3	*Medium*
8	Generating sales report	5	*Medium*
9	Administrator dashboard	8	*Low*
Customer Product Backlog			
Num	***Feature***	***Weight***	***Priority***
1	Login	5	*Large*
2	Products list	8	*Large*
3	Carts	8	*Large*
4	Order checkout	5	*Large*
5	Upload proof of payment	5	*Large*
6	Printing payment receipt	3	*Medium*
7	Purchase history list	5	*Medium*
8	Monitoring order progress	5	*Medium*
9	Customer dashboard	8	*Low*

C. System Design

The system is designed using UML, namely Use Case Diagrams. The use case diagram of the system has two actors and sixteen activities. The two actors are administrator and customer. While the defined activities required by the system can be seen . The database was created to map the entities involved in the system, the relationships between entities and the attributes that accompany each entity. The system database design can be seen



Usecase diagram.

D. Sprint

There are three sprint cycles that are followed during application development. The target for each sprint can be seen

Sprint 1				
Num	***Feature***	***Weight***	***Priority***	***Status***
1	Login	5	*Large*	New
2	Managing products data	8	*Large*	New
3	Managing promotions	8	*Large*	New
4	Managing customer data	5	*Medium*	New
5	Managing customer purchase data	5	*Large*	New
6	Confirm payment by customer	5	*Large*	New

Sprint 2

Num	***Feature***	***Weight***	***Priority***	***Status***
1	Customer Registration	8	*Large*	New
2	Printing payment receipt	3	*Medium*	New
3	Generating sales report	5	*Medium*	New
4	Products list	5	*Medium*	New
5	Carts	5	*Large*	New
6	Order checkout	5	*Large*	New
	Monitoring order progress	5	*Medium*	*New*

Sprint 3				
Num	***Feature***	***Weight***	***Priority***	***Status***
1	View Payment Status	Bobot	Prioritas	New
2	Administrator dashboard	5	*Medium*	New
3	Purchase history list	8	*Low*	New
4	Customer dashboard	5	*Medium*	New
5	View order progress	8	*Low*	New
6	Printing payment receipt	5	*Medium*	New

System testing is done by running the system according to the test scenario that has been made. Some of the scenarios and the results of the tests that have been run can be seen in Table III.

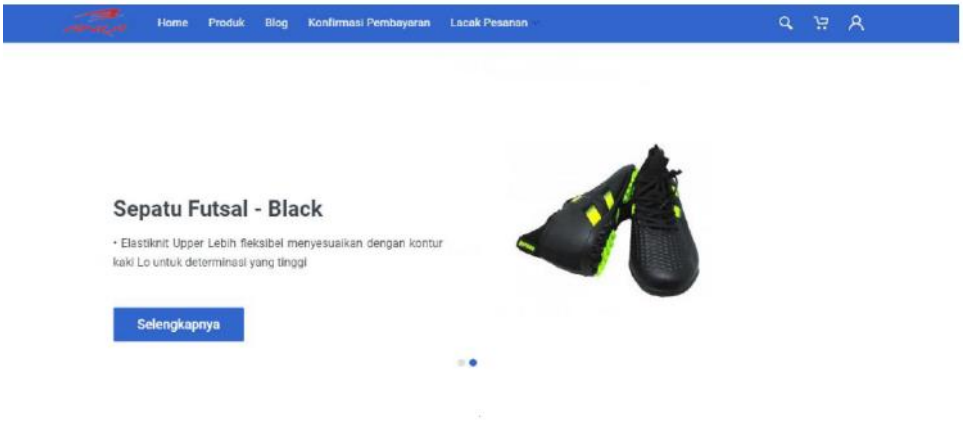
TABLE III. TESTING SCENARIO

No.	Testing Scenario	Expected Output	Result
Login			
1.	User input correct username and password	System display main page	Succeed
2.	User input wrong username and/or password	System display "wrong password" notification	Succeed
Manage Products Data			
3.	Administrator clicks manage products button.	System display products list page	Succeed
4.	Administrator add product button	System display add form and save new product in the database.	Succeed
Shopping			
5.	Customer add new products in to the shopping cart	Shopping cart include added product	Succeed
6.	Customer clicks "payment receipt" button	System display field to upload receipt and save the uploaded receipt	Succeed

After system testing completed, the next phase was sprint review. At this phase, a demonstration of the results of each sprint is carried out. The reviews obtained after the first sprint demonstration were that all the features worked well, the display was good and responsive, the menus displayed were not confusing and the labels and form fields were very clear but the function needed to be added to update the speed of customer orders. This additional function is then entered into the sprint backlog in the second sprint. During the delivery of the results of the second and third sprints, feedback was obtained in the form of all the features running well and the order management and shopping cart features were considered interactive. During the demonstration of the second and third sprints, the user does not propose any additional new functions.

E. Deployment

At this stage, the installation of features that have been approved by stakeholders for use. This step is performed for each sprint process. Some examples of the interface display of the features that have been installed



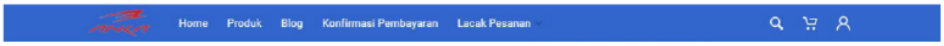


Fig. 4. Website homepage.

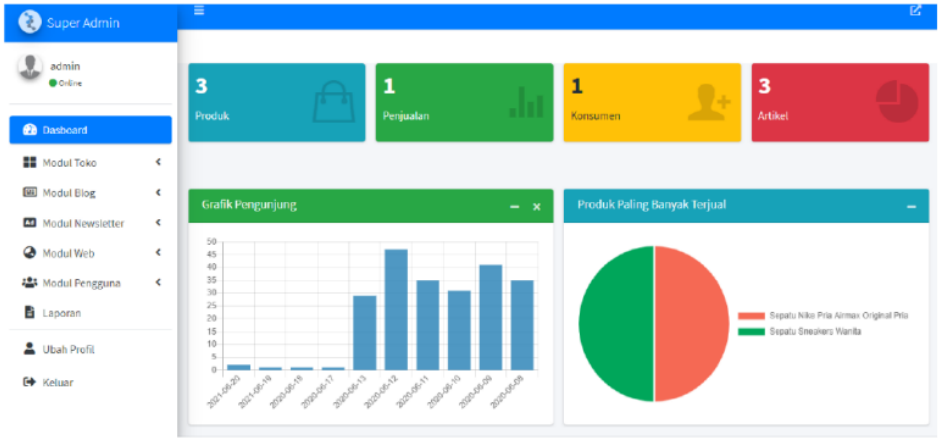


Fig. 5. Administrator dashboard.

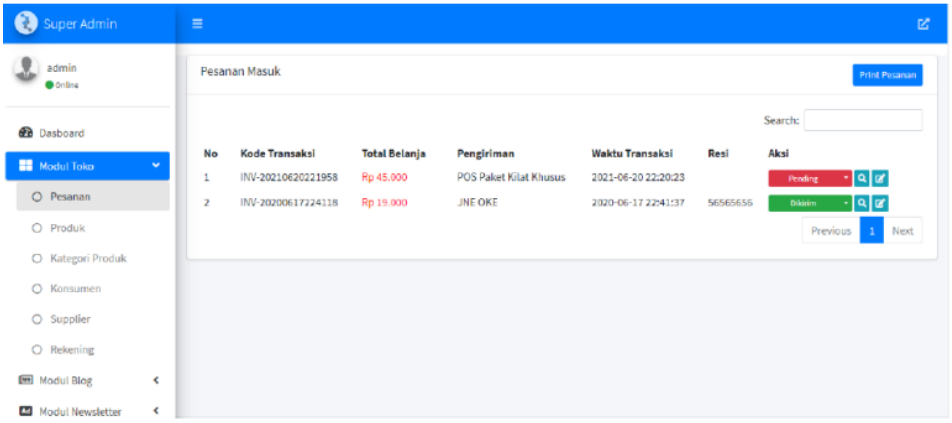


Fig. 6. Product list.

Fig. 7. Shopping cart

IV. DISCUSSION

From this research, it can be concluded that the application developed can help small medium enterprises, especially traditional shop to manage product and data sales. In addition, it also made easier or purchase products and monitor the progress of their orders. Developing application using Scrum method helped the development and management team of small medium enterprise defining system requirements and made it easier for the development team to obtain reviews of the built features so that the deployment process can be carried out immediately. for customers to place orders