DESIGN OF WEBSITE-BASED E-COMMERCE INFORMATION SYSTEM USING EXTREME PROGRAMMING METHOD (CASE STUDY: BELV BOUTIQUE)

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ABSTRACT

The purpose of this research is to provide a REST API-based web service for an online fashion product ordering platform, using boutique belv as a case study. The purchase process carried out at boutique belv At this time, consumers must visit boutique belv directly to complete their purchase because it is currently still processed offline, where payments are still made in cash and buyers must visit the store directly to complete the purchase. Payments and transactions are still paid in cash. In addition, sales transactions are still recorded manually which are prone to errors. This research aims to create a web application that utilizes REST API technology. With the help of this application, users can order products online and pay directly through the website without having to visit the store. In addition, the transaction recording system is automated, thus ensuring that all sales data is recorded accurately, this reduces the possibility of recording errors and simplifies the sales reporting process. Extreme programming is the software development methodology used. It includes design, coding, testing, and planning phases. The system also uses Blackbox testing which is expected the test results show that each functionality works as intended, indicating that the use of web services can increase the speed of the application and streamline the purchasing process and assist buyers in the purchasing process. boutique belv anticipates increased operational effectiveness and provides this solution.

Keywords*: Extreme Programming, Ordering, REST API.*

I. INTRODUCTIONS

The world of information technology is currently experiencing intense competition as a result of the rapid development of the information technology industry. Information technology has a significant impact on a company's ability to grow. There are many ways to advertise one's company. Buying and selling can be done easily thanks to technology, largely because information systems play a role in the process. People can now accomplish tasks faster and more effectively thanks to technology, and internet sales systems are one of the most important forms of technology accessible today. Today, companies use e-commerce to market their products and services online and offline in an effort to increase sales. All the phrases “E-commerce” basically imply the same thing. These phrases refer to the electronic buying and selling of goods, which is done over the internet. According to [1]. The advancement of technology has led to the emergence of interactive features and enhanced user experiences on e-commerce platforms, boosting customer engagement and loyalty. The use of big data, artificial intelligence, and blockchain is seen as a way to strengthen the resilience and sustainability of e-commerce organizations against cyber threats. Additionally, digital technology improves the speed and accuracy of data transmission, reducing delays and errors in online transactions. The expansion of internet access and innovations such as digital payment systems and mobile devices further enhance integration and efficiency within the global e-commerce ecosystem [2]. One of the sellers and admirers of batik fabrics, both contemporary and traditional batik, is Belv Boutique. This is also a challenge for Belv Boutique to develop faster because the ordering mechanism is still using whatsapp or coming directly to the boutique. In addition, Belv Boutique also still has difficulties in advertising on social media and sales which still rely on conventional marketing strategies, non-cash payments that are transferred and verified via whatsapp are still used in the Belv Boutique product purchase transaction system. These payments cause errors when compiling payment plans used to document Belv Boutique's revenue. In addition, manual recording using books is still used in the belv Boutique product sales report. Therefore, there are often errors in recording sales reports which result in a mismatch in product data and the amount of income sales data for products that have been sold. Based on the description of the problems that occur above, an online sales system is needed. With the advantages of online applications and the latest product information available at the latest Belv Boutique, website technology was chosen with the aim of attracting clients in order to increase closeness

with customers. In addition, the web-based application is designed with the aim to simplify the process for customers in using their smartphones to buy products from Belv Boutique anytime and anywhere. Extreme Programming (XP) is a software development methodology used to create a web-based E-Commerce information system. The four steps of the extreme programming process are design, coding, testing, and planning [3].

II. LITERATURE REVIEW

a. E-Commerce

The distribution, buying, selling, and promotion of products and services through electronic networks, including the internet, television, radio, and other computer networks, known as e-commerce, or electronic commerce [1].

In turn, e-commerce isone of the areas of the digital economy that is actively developing. E-commerce covers all financial and trade transactions carried out through computer networks, and business processes related to such transactions[4]

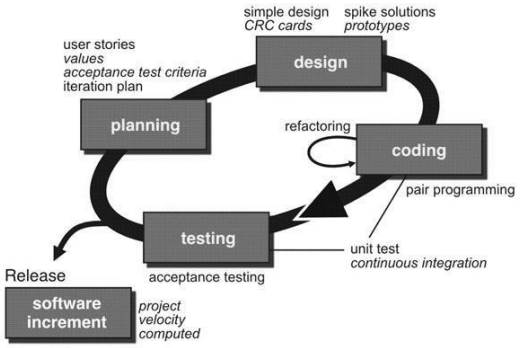
b. Application Programming Interface

System developers provide interfaces known as Application Programming Interfaces (APIs) to allow programmatic access to any or all system functions. A clear set of techniques to facilitate communication between different software components is known as an API. APIs are created to make it easier for developers to utilize certain technologies when they develop software or applications [3].

c. Payment Gateway Midtrans

Midtrans is a payment gateway that offers services with various payment options to help fulfill the needs of online companies. For industry players, this service simplifies operations and increases revenue [5].

d. Extreme Programming Method



Picture 1 Metode Extreme Programming [6]

A component of the development methodology Extreme Programming (XP) focuses on the coding process, a critical step in the software development cycle. XP is highly adaptable to change. In XP, there is literacy that can be done as many times as necessary. XP consists of steps that are easy to complete in a short time and can be repeated at different stages and adapted to the objectives at each stage. Phases one to four of the XP software development process include planning, designing, coding, and testing [7].

Extreme programming, an agile model, was invented by Kent Beck in the year of 1996. He then introduced his work on Extreme programming in a much sophisticated and advanced form in the shape of a book known as “Extreme Programming Explained”. It is quite simple, uncomplicated, and more adaptable methodology of development with the capacity to oversee unclear, ambiguous,or quickly varying requirements[8]

e. Hypertext Preprocessor (PHP)

The PHP programming language is a tool used in web design, where a web page is a page that displays data, movement in images, videos, or a combination of the two for static and dynamic features that change over time and create a connected sequence [9].

f. Blackbox Testing

Program quality testing that concentrates on program functionality is known as blackbox testing. Finding improper functions, interface problems, data structure errors, performance problems, initialization and termination errors are the goals of black box testing [10].

g. Literature Study

1) WEB-BASED FOOD ORDERING INFORMATION SYSTEM DESIGN AT SURABIKU CAFE - The design of this web-based ordering application can facilitate communication between officers and buyers. The system offers a variety of services, such as the ability to order food and drinks online [11].

2) Payment Gateway Implementation Using Midtrans on the Geberco MSME Website - the implementation of the payment gateway on the website has been able to run well The implementation of the midtrans payment gateway with the Laravel website project is very easy to do, seeing how much documentation already exists on the official midtrans website [12].

3) WEBSITE-BASED ONLINE BOOKING APPLICATION DESIGN ON DANKIE BARBERSHOP USING WEB FRAMEWORK AND PAYMENT GATEWAY - The owner and administrator of this Dankie Barbershop Online Booking Application can generate transaction reports in PDF format. The start and end date of the report can be selected by the admin and owner. Reports can also be generated using the services or hairdressers selected by the client. The report information is presented in the form of transaction data, which includes: customer name, transaction time, selected services and hairdressers, time and date of order, amount of money, and total revenue [13].

4) Design of Mobile E-Commerce Information System (Case Study Raya Selluler Demak) - The results of blackbox testing for the login feature in the e-commerce system, user acceptance testing data on interface design, flow operation, features in the system, feature functions, data presentation, and data search on the web, the conclusion of the research which includes the objectives of e-commerce development, the actors involved, and the results of user acceptance testing [14].

III. RESEARCH METHODS

a) Research Plan

Develop an E-Commerce Information System Application that solves problems systematically and scientifically. Within a certain period of time, the research time will be arranged in the form of (Gantt Chart), or a timeline schedule table. The purpose of this research is to find answers and solutions through a systematic research process and scientific methodology.

b) Research Object

The object of research raised is Belv Boutique. Belv Boutique is one of the boutiques located on Jl. Pondok Serut No.10 RT 05 / RW 03 south Tangerang, North Serpong, Banten. Belv boutique is a fabric seller aimed at people who like fabrics and fabric lovers.

c) Data Collection Techniques

This research used a number of methods to gather the information needed to match the features desired by the owner of belv boutique using several techniques, such as:

1) Observation

Data collection method by making observations, namely by directly observing the business process activities that take place at belv boutique to obtain the information needed.

2) Interview

Interviews were conducted with stakeholders from belv boutique to collect the data needed through questions and answers or interviews, both related to ongoing business processes, problems faced, options for solutions to existing problems.

3) Literature Study

At this stage of the literature study, the search and collection of information needed to study and understand the relevant literature of Website-Based E-Commerce Information System Design Using Extreme Programming Method in making the final project research report.

4) Software Development Methods

Stage used in building a web-based E-Commerce system using Extreme Programming is :

a. Planning: The planning stage is the initial stage of the XP approach, at this stage explaining the user needs described using User Stories (US) at belv boutique.
b. Design: At the design stage, system modeling is carried out based on the results of the analysis of the needs of both functional needs at belv boutique.
c. Coding: the coding process is carried out in accordance with the needs and designs that have been planned previously.
d. Testing: Testing of E-Commerce information systems in website-based belv boutiques is carried out to see whether the system or application made still has errors in both the flow and logic of programming and to see if the functions in the system run as it should.

IV. RESULTS AND DISCUSSION

a) Research Result Data

This research involves data collection through observations, interviews, and literature studies at belv boutique. Based on the results of observations and interviews with the owner of Belv Boutique, it is known that currently orders can only be made via WhatsApp or Instagram messages. This is because other media such as the marketplace cannot be used, which results in a decrease in sales. Belv Boutique's manual and limited ordering system hinders product marketing and limits Belv Boutique's needs from competitors in terms of fabric ordering systems. This also requires more time and cost to achieve sales targets.Therefore, designing a booking application through a website is expected to be a solution to overcome these problems and differentiate Belv Boutique among competitors in terms of product ordering systems.

b) Planning

Business and system requirements will be generated during this planning step in relation to the exploration stage, which was conducted earlier. There are two categories of business requirements: functional requirements and non-functional requirements.

1) Functional and Non-Functional Requirement Analysis

Interviews and observations resulted in the conclusion that the needs analysis is divided into two functional and non-functional analysis and can be seen in the table below, among others:

TABLE 1
ADMIN FUNCTIONAL REQUIREMENTS

Admin		
No.	**Function**	**Requirement Specification**
1	Login	A system that provides features to perform the login process
2	Dashboard	A system that can display a list of incoming orders, total revenue, number of products, number of transactions, and overall customer data
3	Manage Customer Data	system that provides features to the application website to display, add, edit, and delete customer data
5	Manage Category Data	A system that gives application websites the ability to add, edit, delete, and display category data
6	Manage Product Data	A system with the ability to add, edit, delete and display product information on the application website
7	View purchase data	A system that provides a feature to display purchase data on the website which is later used for booking confirmation
8	Manage Sales Report	System that provides features to manage sales reports on the application website
9	Logout	A system that provides a feature to exit or leave the application website

TABLE 2
CUSTOMER FUNCTIONAL REQUIREMENTS

Customer		
No.	**Function**	**Requirement Specification**
1	Register	A system with a feature that allows new users to create accounts
2	Login	system where users can log in
3	Ordering Fabric	A method that allows online ordering of fabrics
4	Payment Gateway	System that provides automatic confirmation from midtrans payment gateway
5	View Transaction Data	A system that provides information about transactions that are being sent or have been completed
6	Profil	A system that shows customer data
7	Logout	A system that has a feature to log out of an account

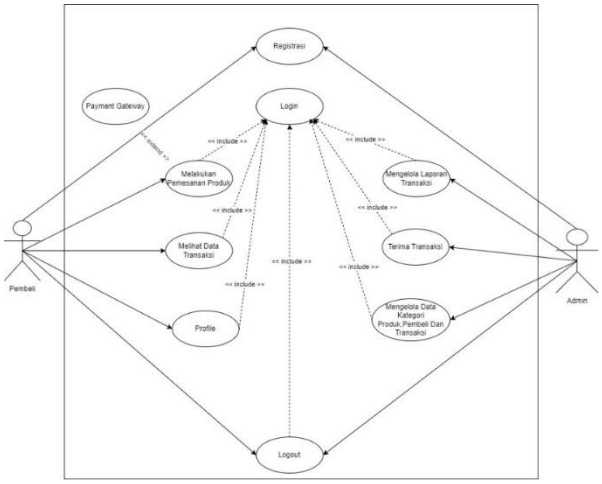
2) Midtrans API Process

To utilize the midtrans API, a midtrans key is required as a link between the system and midtrans itself and to make payment transactions. After the payment transaction is completed, the data will be stored in the database and a payment invoice will be generated.

c) Design

The design stage uses the findings from examining both functional requirements. User interface and User Experience. The system will have a dynamic and adaptable design.

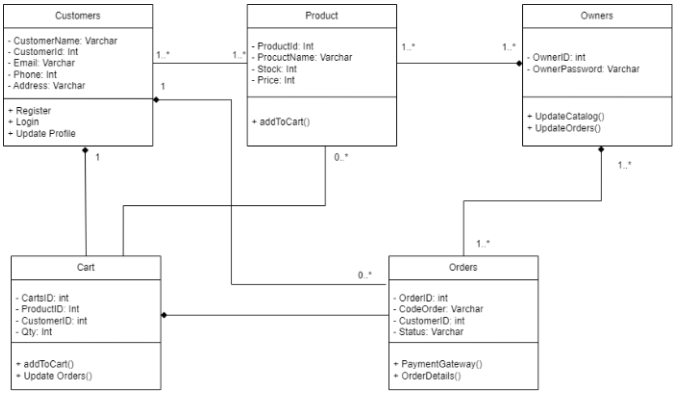
1) Use Case Diagram



Picture 2 Use Case Diagram

There are two actors, namely admin and customer, the admin first registers and logs in to access the website, then the admin can manage product data, categories, customers, transaction reports, and orders. Customers can log in first, if they do not have a customer account, they can register, then customers can view products, categories, manage baskets, place orders and view transaction data.

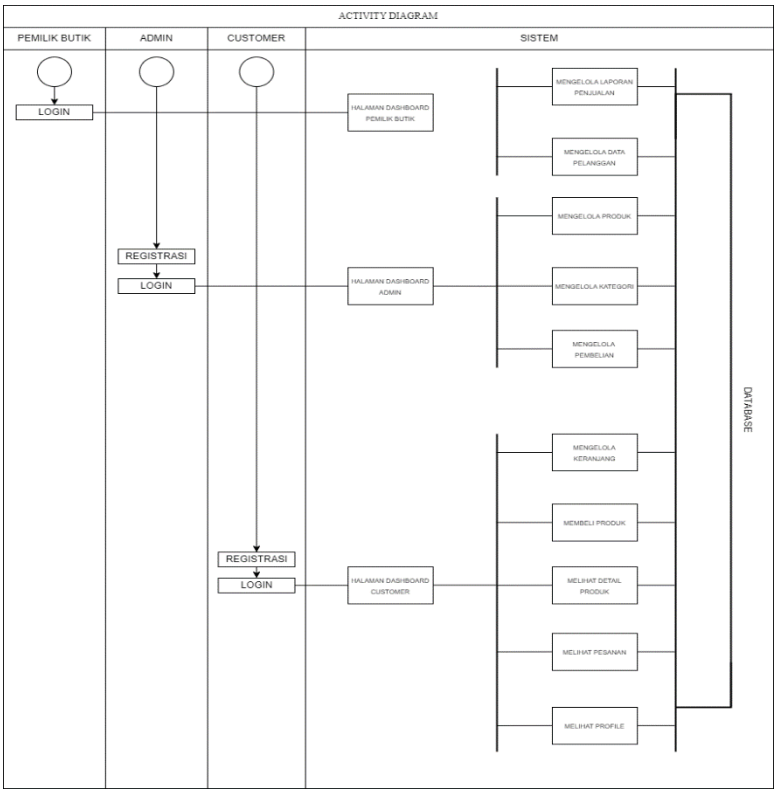
2) Class Diagram



Picture 3 Class diagram

The class diagram in Picture 3 depicts an e-commerce system with the following main entities: “Customers” with attributes CustomerName, CustomerId, Email, Phone, and Address and operations Register(), Login(), and UpdateProfile(); ‘Product’ with attributes ProductId, ProductName, Stock, and Price and operation addToCart(); ‘Cart’ with attributes CartId, ProductId, CustomerId, and Qty and operations addToCart() and UpdateOrders(); “Orders” with attributes OrderId, CodeOrder, CustomerId, and Status and operations PaymentGateway() and OrderDetails(); and ‘Owners’ with attributes OwnerId and OwnerPassword and operations UpdateCatalog() and UpdateOrders(), with the relationship between these entities as follows: a customer can have multiple orders, each order is associated with one customer, a product can be in multiple carts and orders, an owner can update multiple orders and catalogs.

3) Activity Diagram



Picture 4 Activity Diagram

This activity diagram shows the process flow of the online boutique system where the boutique owner, admin, and customers have their respective roles. Boutique owners and admins can login and access their dashboards to manage sales reports, customer data, products, categories, purchases, and carts through a system connected to the database. Customers can register, login,

and access their dashboard to view product details, make purchases, view orders, and manage profiles.

d) Coding

In this step, the coding process is carried out in accordance with the needs and designs that have been planned previously. This coding process is divided into three main stages: frontend (website display), backend (part of the system that works behind the scenes to manage the database and system functions), and database (structured data storage).

1) Blade Template Engine
Laravel offers the Blade template engine, which is a tool that makes web page development a simple yet helpful templating procedure.

2) Routing
Routing is one of the core components in web applications that allows you to define URL addresses that will be mapped to specific controllers in your application. In Laravel, routing is used to direct all HTTP requests to the right handler/method.

3) Model
Model, The data structure is represented by a model. Models often have features that help with database administration, including adding and modifying data.

4) View
View is the part that displays the user interface to the user. It can also be referred to as a web page.

5) Controller
Controller is a PHP module with complete functionality to parse user HTTP requests and generate relevant responses.

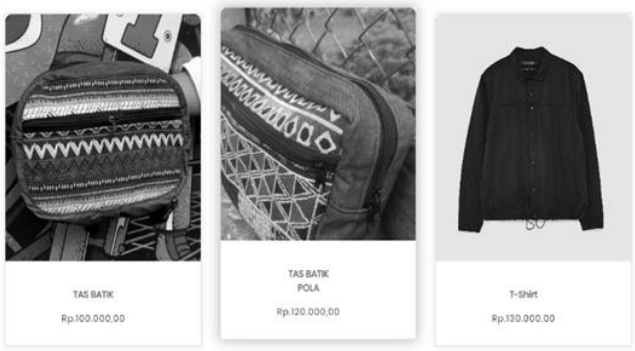
6) User Interface

I. Home Page

Picture 5 Home Page

In Picture 6 is the user interface of the home page from the customer side

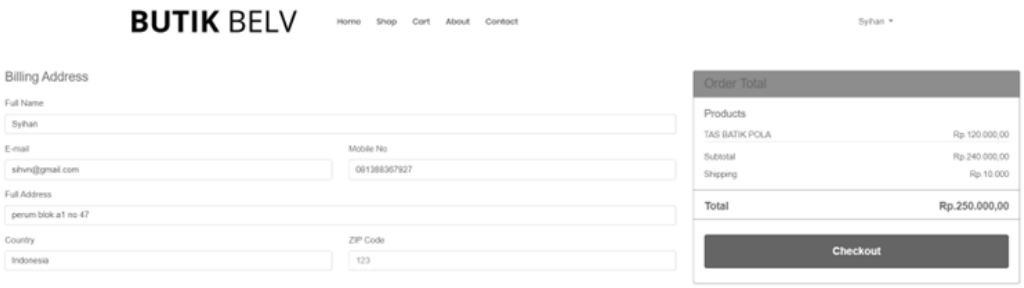
II. Shop Page



Picture 6 Shop Page

Picture 7 is the user interface of the shop page which contains products from belv boutique.

III. Checkout Page



Picture 7 Checkout Page

Picture 8 is the user interface of the checkout page

e) Testing

The testing stage includes implementing the system to check which systems are successfully running and not running successfully.

1) Blackbox Testing

Black Box Testing has the aim of proving the functionality that exists in the application, so that there are no features that are errors or do not run as expected. The following table shows the results of Black Box Testing:

TABLE 3
BLACKBOX TESTING ADMIN

No	Testing Page	Activities	Testing Results	
			Successful	Failed
1	Login	1. Fill in the username and password data 2. Press the sign in button	√	
2	Dashboard	1. Display the dashboard page after successful login 2. Display the menu in the system	√	
3	Categories	1. Displays a list of Categories data 2. Add categories 3. Edit categories 4. Delete categories	√	
4	Customers	1. Display and view data on customers who have successfully registered and logged in 2. Can edit customer data	√	
5	Orders	1. Display a list of customers who have placed an order	√	

No	Testing Page	Activities	Testing Results	
			Successful	Failed
6	Status Orders	1. Display the list of order data from the orders page 2. Can edit and process orders by inputting receipts and changing package status 3. Delete Order	√	
7	Products	1. Displays Products on sale 2. Add Products 3. Edit Products 4. Delete Products	√	
8	Users	1. Displays Products on sale.Displays Users who are logged into the admin website 2. Add users 3. Edit users 4. Delete users	√	
9	Midtrans Sales Report	1. Display transaction data. 2. Export data into csv/excel	√	
10	Logout	1. Can press the logout menu 2. Can return to the sign in page	√	

TABLE 4
BLACKBOX TESTING CUSTOMER

No	Testing Page	Activities	Testing Result	
			Successful	Failed
1	Register	1. Fill in the data contained in the register form 2. Press the register now button	√	
2	Login	1. Fill in email and password data 2. Pressing the login button	√	
3	Home	1. Displays the home page after successful login	√	
4	Shop	1. Displays the Products In Our Shop page 2. Displays Products that are sold 3. Displays product details 4. Can press the add cart button	√	
5	Cart	1. Displays products that are added to the cart 2. Can delete product 3. There is a cart sumarry 4. Can press proceed To checkout	√	
6	Checkout	1. Display Billing Address 2. Displays Order Total 3. Can press the checkout button	√	
7	Payment	1. Displays the payment method 2. Presses the selected method 3. Integration with midtrans 4. Make payment on the mitrands page 5. Check payment status	√	
8	Order History	1. Display the Order History page 2. View the receipt number and package status	√	
9	Profil	1. Display the Profile Page 2. Can edit profile	√	
10	Logout	1. Can press the logout menu 2. Can return to the home page	√	

V. CONCLUSION

The conclusion of this research is that the implementation of a boutique website using Rest API Midtrans on the Belv Boutique ordering application has proven to be effective and efficient in overcoming product ordering and sales reporting problems, the integration of various easy payment methods through Midtrans. API provides added value in improving service quality and user experience.

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