

# Design and Development of Web-Based E-CRM (Electronic Customer Relationship Management) at Bali Tangi

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## Abstrak

Bali Tangi adalah sebuah perusahaan yang bergerak di bidang perawatan dan kecantikan tubuh. Bali Tangi berupaya untuk meningkatkan kepuasan pelanggan dalam penjualan produk perawatan dan kecantikan dalam menghadapi persaingan bisnis yang semakin ketat. Tujuan dari penelitian ini adalah merancang dan mengembangkan E-CRM berbasis web untuk membantu perusahaan dalam memperkuat hubungan dengan pelanggan dan meningkatkan kepuasan pelanggan. Metode penelitian yang digunakan terdiri dari tahap identifikasi masalah dan kebutuhan, melakukan studi literatur, analisa fase CRM dan proses bisnis, perancangan dan pembangunan sistem, pengujian sistem, dan implementasi sistem melalui hosting. Sistem dibangun menggunakan Laravel dan mengimplementasikan Application Programming Interfaces (API). Hasil pengujian fungsionalitas menggunakan black box testing menunjukkan bahwa sistem dapat digunakan sesuai dengan fungsinya. Nilai akhir pengujian dengan usability testing untuk mengukur usability oleh pengguna dihitung dari total rata-rata dari semua indikator dan menunjukkan angka 4.13 dengan kategori memuaskan bagi pengguna.

**Kata Kunci:** E-CRM, Laravel, Application Programming Interface, kepuasan pelanggan, perawatan dan kecantikan

## Abstract

Bali Tangi is a company engaged in body care and beauty. Bali Tangi strives to enhance customer satisfaction in selling skincare and beauty products in the face of increasing business competition. The aim of this research is to design and develop a web-based E-CRM to help the company strengthen customer relationships and improve customer satisfaction. The research method used consists of stages of problem and needs identification, literature study, analysis of CRM phases and business processes, system design and development, system testing, and system implementation through hosting. The system is built using Laravel and implements Application Programming Interfaces. The results of functionality testing using black box testing indicate that the system can be used according to its functions. The final score of usability testing, measuring usability by users, is calculated from the total average of all indicators and shows a score of 4.13 with a satisfactory category for users.

**Keywords:** E-CRM, Laravel, Application Programming Interface, customer satisfaction, care and beauty

## 1. Introduction

Customer satisfaction is one of the factors needed to sustain business and increase profits. High customer satisfaction can increase loyalty and opportunities to recommend products or services to others, thus expanding the customer base and boosting sales. Customer satisfaction can be influenced by various factors such as product or service quality, competitive pricing, good service, and enjoyable shopping experiences [1].

Competition is a common occurrence in the business world where every company must strive to maintain its position and improve performance in order to compete with other companies. Business competition can occur in all sectors, from retail to services to industry.

Companies continually seek ways to attract customer attention through various marketing strategies to address business competition. Customers can easily obtain information about companies through digital technology such as the internet and expect companies to build relationships and provide good satisfaction [2].

Customer Relationship Management (CRM) is a business strategy that refers to how a company manages interactions with customers in selling products or services, processing orders, and collecting customer feedback so that the company can improve the quality of customer relationships and achieve desired business goals. The development of information technology enables CRM to be integrated with technology known as Electronic Customer Relationship Management or E-CRM. E-CRM leverages information technology to automate and enhance customer interactions, thus providing added value in the development of company business [3].

This research aims to design and develop a Web-Based Electronic Customer Relationship Management (E-CRM) for a skincare business called Bali Tangi. The products produced by Bali Tangi consist of natural organic ingredients without utilising additional synthetic chemical ingredients such as spices, natural minerals, and plants processed meticulously and accompanied by strict quality control in producing various products. The issue faced by Bali Tangi is the absence of a customer relationship management-based website to market its products and establish relationships with customers more conveniently.

**2. Research Method / Proposed Method**

The research flow outlines the steps taken in designing the web-based E-CRM for Bali Tangi. The explanation of the research flow for designing and testing the system is as follows.

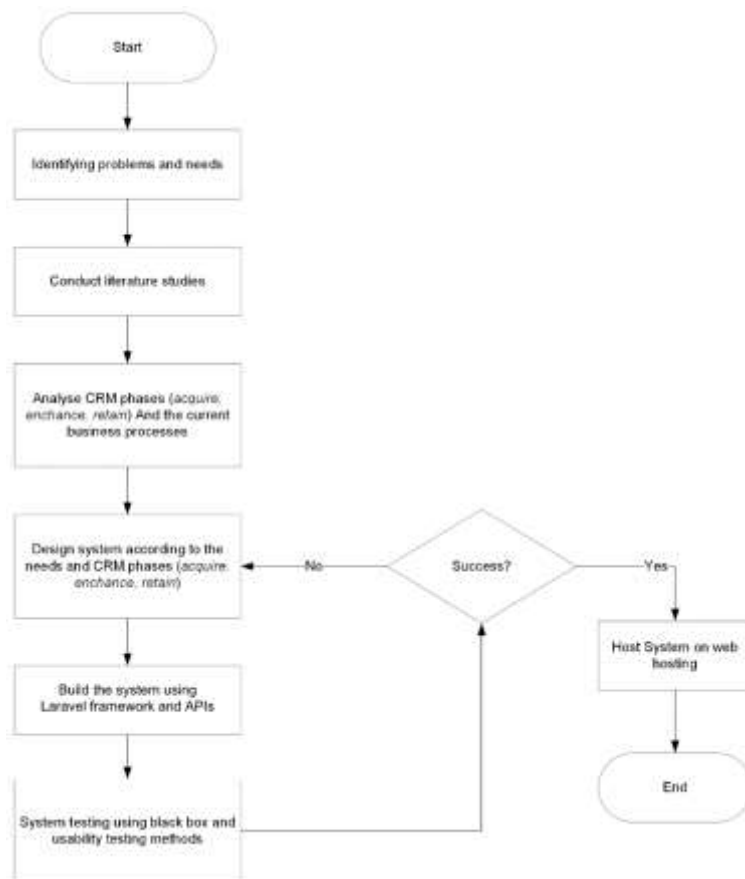


Figure 1. Research Method

Figure 1 illustrates the system design flow of the research. The research begins with identifying the system's problems and needs by conducting a literature review, which involves examining relevant journals from previous studies and engaging in interviews with representatives of the company. Once the problems and needs are identified, the next step is to analyse the CRM phases and business processes already in place at Bali Tangi. The web-based E-CRM system at Bali Tangi is designed and developed according to the existing needs and CRM phases. CRM consists of three interconnected phases. These three phases relate to the stages a company goes through with CRM and the relationship between customers and the company, namely acquire, enhance, and retain [4]. The system design model consists of creating proposed business process SOPs, data flow diagrams, and designing a physical data model for the database.

System development is carried out using PHP language with the Laravel framework. Laravel is an open-source and free PHP-based web application framework. It provides various features and tools to assist developers in building fast, efficient, and easily maintainable web applications. Laravel employs the Model-View-Controller (MVC) concept, which separates data, views, and application logic, and offers various features to help developers build web applications quickly and efficiently, such as well-organised routing, database migration, templating system, authentication, input handling, and database connection [5]. This system integrates Laravel together with APIs. Application Programming Interface (API) is a set of rules, protocols, and tools that allow applications to interact with other applications, platforms, or services [6]. The APIs used consist of two types: e-mail marketing API through Mailchimp and payment gateway API through Midtrans. E-mail marketing is a digital marketing practice in which companies or individuals send promotional emails or other messages in bulk to a group of people via email [7], while payment gateway is a system that enables electronic payment transactions between buyers and sellers within an e-commerce platform or other applications [8].

System testing is performed using black box testing and usability testing once the system has been built. Black box testing is a software testing technique performed without considering how the code is written or how the system works internally. In this method, testing is done solely by inputting data into the software and evaluating the output generated, without considering how the data processing is performed. In this case, testing focuses on functionality and compatibility between user requirements and the system being tested [9]. Usability testing is a software testing method aimed at evaluating how easily users can use a product or system. This testing is conducted by assessing users' ability to perform specific tasks using the product or system, and measuring user satisfaction with the user experience [10]. The system will be hosted on web hosting upon successful completion of the testing phase.

### 3. Literature Study

The first research discusses the development of a web-based E-CRM application at PT. Bali Segara Indah Watersport. The development of this application is aimed to address issues related to online marketing and building relationships with customers. The E-CRM application at PT. Bali Segara Indah Watersport is designed using the Codeigniter framework and MySQL database [11].

The second research discusses the implementation of E-CRM in the digital library of Gema Nurani School to enhance the relationship, dedication, and loyalty of library users so that the interest in reading among visitors can increase. The system is developed using the FAST (Framework for the Application of System Thinking) method with the Model Driven Development Strategy approach because it has standardisation and stable processes [12].

The third research discusses the development of CRM at PT. Sanprima Sentosa. The CRM development is carried out using the Rapid Application System (RAD) model. The developed CRM application is web-based with MySQL as the database. The research results conclude that the implementation of web-based CRM can be an effective solution to improve customer loyalty [13].

The fourth research discusses the design of a Customer Relationship Management application to foster good relationships with customers and increase sales. The method used in application development is prototyping, aimed at understanding the desires and complaints of customers. The application development is carried out using PHP language with Laravel framework and MySQL database [14].

The fifth research discusses the implementation of information system in the form of E-CRM at Dinikoe Ceramics by applying customer relationship management strategies to maintain existing customers. The system is developed using the waterfall development model and obtained 16 functional and 2 non-functional requirements as the basis for developing the E-CRM system. Validation testing results indicate that the system can meet user requirements [15].

The E-CRM system designed in this research includes several new feature developments aimed at strengthening interaction between customers and the company. Customer service can display customer data grouped based on transaction history within a certain period. The company can also send marketing emails containing special offers to customers based on the created grouping to improve customer retention.

#### 4. Result and Discussion

The web-based Electronic Customer Relationship Management system at Bali Tangi has six main features, as follows.

##### 4.1. Coupon Management

The coupon management feature is used by the sales admin to display data on coupons that have been previously added.

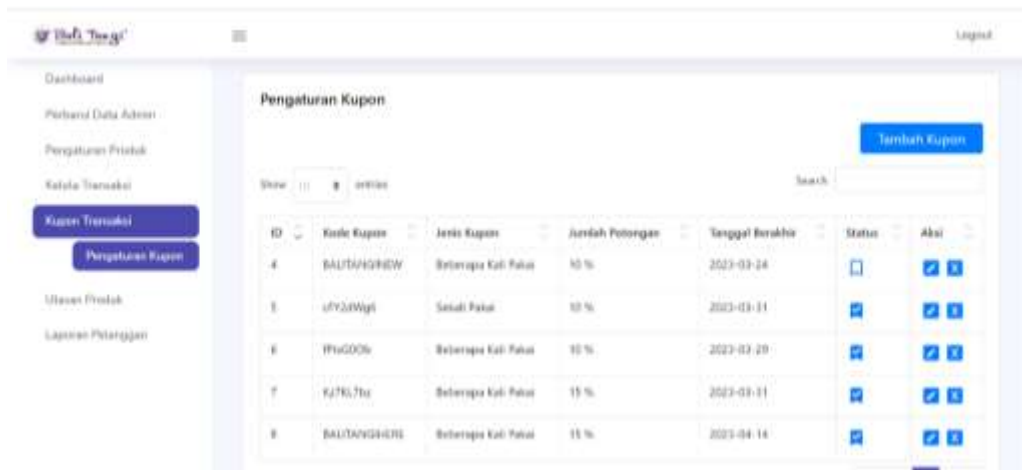


Figure 2. Coupon Management Page

Figure 2 shows the interface display of the coupon settings menu. Sales staff can view the list of coupons that have been entered and can be used by customers according to the terms. Each coupon has a coupon code, coupon type, amount of discount provided, and expiration date of the coupon. Sales staff can add coupons through the add coupon button.

##### 4.2. Newsletter Management

Subscribers can receive email newsletters containing promotions, offers, and the latest news by entering their email in the provided form. The email address entered by the subscriber can then be registered on the Mailchimp dashboard.

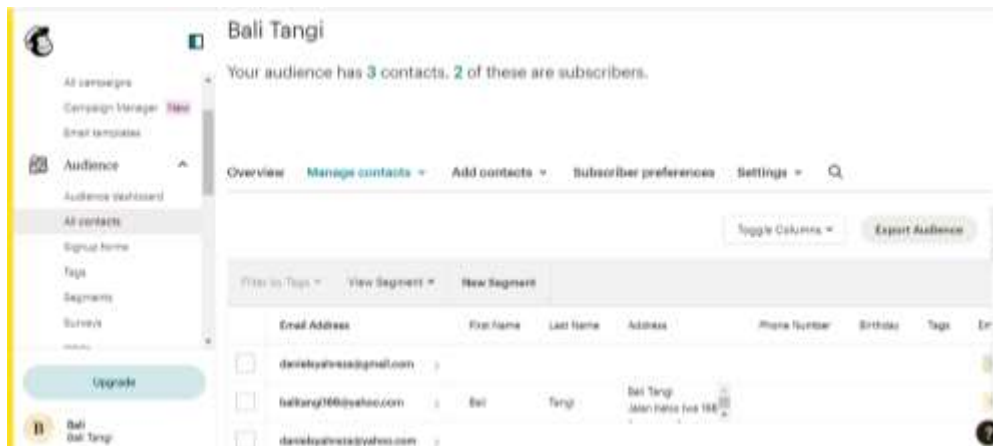


Figure 3. Mailchimp's newsletter contacts page

Figure 3 shows the interface display of the Mailchimp dashboard menu under the All Contacts section. In this menu, customer service can view a list of subscribers who have subscribed to receive newsletters by entering their email addresses. Customer service can send email newsletters to subscribers who have already subscribed. The interface display of the newsletter sending page can be seen in the following figure.

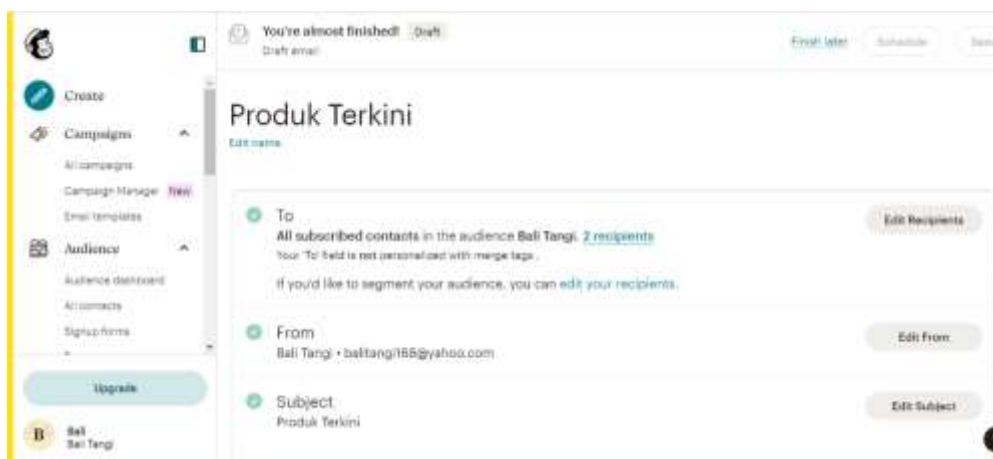


Figure 4. Mailchimp's sending campaign page

Figure 4 shows the interface display of the Mailchimp dashboard on the Create Campaigns page. On this page, customer service can send emails containing promotions, product offers, and the latest news to subscribers who have already subscribed. Customer service inputs data such as email recipients (subscribers), sender name and email, email subject, and email content.

### 4.3. Customer Report

Customer Service can display customer reports based on customer data who have made transactions or purchased products. The results of implementing the feature to display customer reports can be seen in the following figure.

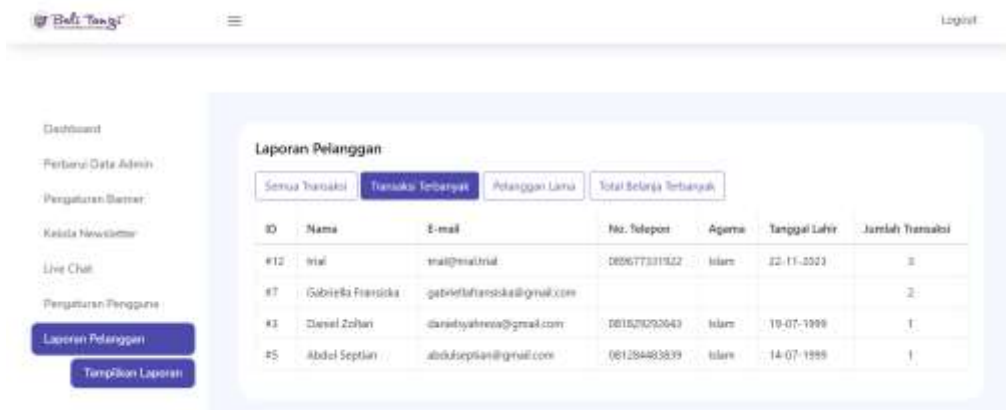


Figure 5. Customer report page

Figure 5 shows the interface display of the customer report viewing menu. Customer service can view customer report data based on the highest number of transactions, longtime customers, and the highest total spending from customers in the descending order.

#### 4.4. Product Checkout

The checkout page is a page to display the list of products, customer shipping address details, and options for product delivery services when customers make transactions such as purchasing desired products. The results of implementing the feature to display the checkout page can be seen in the following figure.

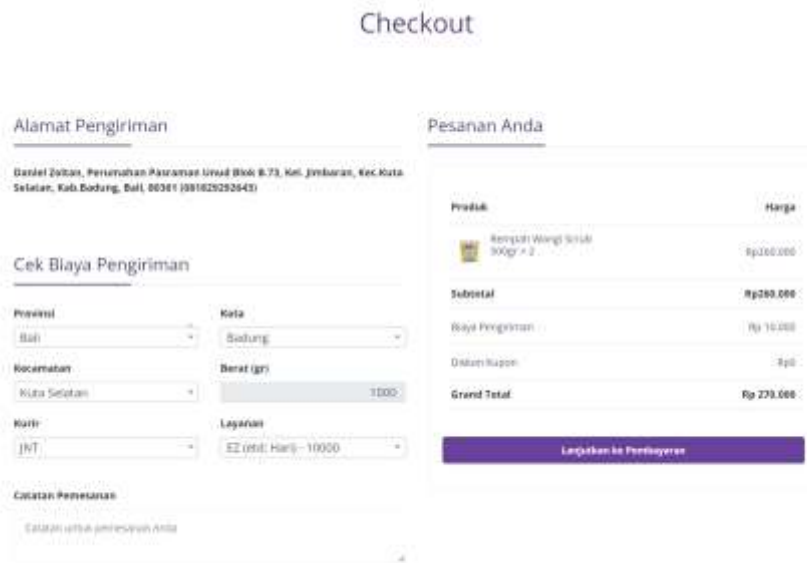


Figure 6. Customer checkout page

Figure 6 shows the interface display of the checkout page. Customers view the product shipping address, check and obtain the shipping costs, add order notes, and view details of the ordered products. If the selected products are correct, customers can proceed to payment using the Midtrans payment gateway.

#### 4.5. Product Review by Customer

The review feature is a feature found on the product detail page where customers can provide reviews or ratings for products after purchasing them. The results of implementing the product review feature can be seen in the following image.

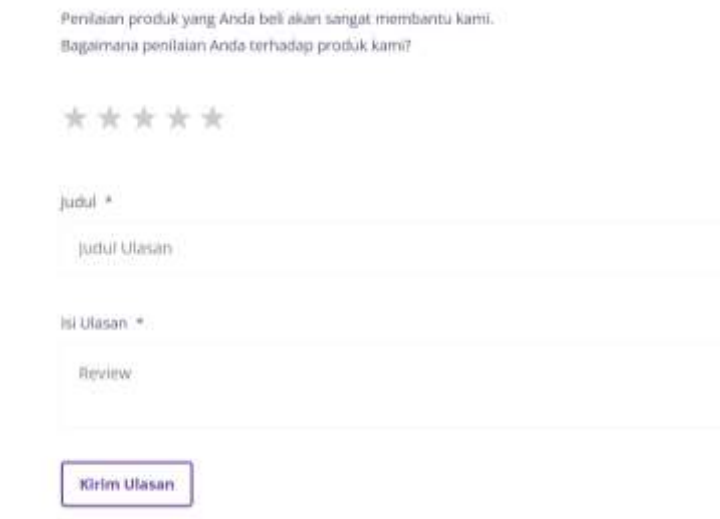


Figure 7. Customer review section

Figure 7 shows the interface display of product reviews. Customers can provide product reviews after purchasing the product. The reviews provided consist of a rating, review title, and review content.

#### 4.6. Live Chat Delivery

The feature of sending messages via live chat by customers allows customers to send messages to customer service through a live chat pop-up. The results of implementing the live chat message sending feature through the tawk.to pop-up can be seen in the following image.

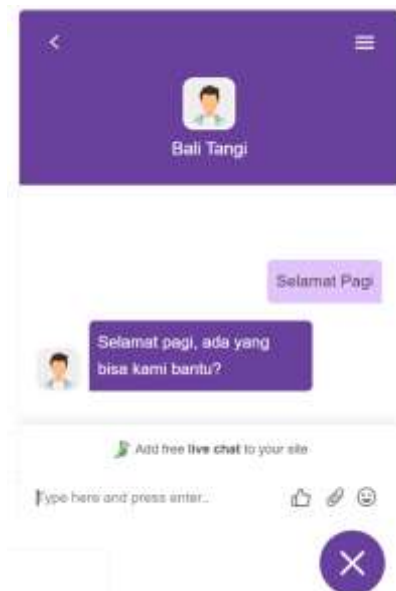


Figure 8. Customer pop-up chat

Figure 8 shows the interface display of the live chat pop-up. Customers and website visitors can start sending messages to customer service by clicking the chat logo button located in the bottom right corner of the page.

#### 4.7. System Testing

The system testing is conducted using black box testing method to test the functionality of features and usability testing to test the usability of each respondent. Testing using black box

testing is carried out through testing scenarios for each test case or feature to be tested. The results obtained from testing with black box testing determine whether the feature meets the requirements. Usability testing is conducted using 5 indicators, namely learnability, efficiency, memorability, error, and satisfaction. The results obtained from usability testing can indicate the level of comfort and satisfaction of respondents as system users. System testing using black box testing with customer users can be seen in the following table.

Table 1. Black Box Testing for Customers

Test Case	Output	Result
Log in and Register	The system receives data filled in by customers and directs them to the main page (home).	Succeed
Profile Update	The system updates the data of the entered customers.	Succeed
Product Transaction	The system can be used by customers to make transactions by purchasing products and completing payments.	Succeed
Giving Review	The system enters the review data submitted by customers when they have purchased the product.	Succeed
Sending Live Chat	The system forwards the data and messages entered by customers to the tawk.to dashboard.	Succeed

Table 1 shows the black box testing scenario for customers. Black box testing on customer features is conducted to identify errors in data structure, discrepancies in the user interface, and malfunctioning functionalities in each customer feature. Next is the Functional testing with black box testing on the admin features which can be seen in the table below.

Table 2. Black Box Testing for Admins

Test Case	Output	Result
Log in	The system receives data filled in by admins and directs them to the main dashboard.	Succeed
Manage product	The system can add, update, and delete product data.	Succeed
Manage product category	The system can add, update, and delete product category data.	Succeed
Manage banners	The system can add, update, and delete banners data.	Succeed
Manage coupons	The system can add, update, and delete coupons data.	Succeed
Manage transactions	The system can verify the transaction status of customers.	Succeed
Manage newsletter	Customers can receive personalised emails after they have been sent.	Succeed
Manage live chat	Customer service can reply to messages sent by customers.	Succeed
Show customer reports	The system displays customer reports according to the filters selected by the customer service.	Succeed

Table 2 shows the black box testing scenario for admins. Black box testing on the admin features is conducted to identify errors in data structure, inconsistencies in the user



interface, and functionalities that do not work well in each admin feature. Next is the summary of the testing results using the usability testing method, which can be seen in the table below.

Table 3. Usability Testing Results

	Indicator										
	Learnability		Efficiency		Memorability		Error		Satisfaction		
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	
A1	3	3	3	3	2	3	3	3	3	3	
A2	5	5	5	5	5	5	5	5	5	5	
A3	3	3	3	4	2	4	3	3	4	3	
A4	5	5	5	5	5	5	5	5	5	5	
A5	5	5	5	5	5	5	5	5	4	5	
Frequency of Answers from All Users	A6	3	3	3	3	3	3	2	2	3	3
	A7	5	5	5	5	5	5	5	5	5	5
	P1	5	5	5	5	5	5	5	5	5	5
	P2	3	3	3	3	3	3	3	2	3	
	P3	5	5	5	5	5	5	5	5	5	
	P4	3	3	3	3	3	3	3	3	4	
	P5	5	5	5	5	5	5	5	5	5	
	P6	3	3	3	3	3	3	3	3	2	
	P7	5	5	5	4	4	4	5	5	4	5
	P8	5	4	5	5	5	5	4	4	5	5
Average		4.20	4.13	4.20	4.20	4.00	4.20	4.07	4.07	4.07	4.20
Average/indicator		4.17		4.20		4.10		4.07		4.13	
Average indicator total		4.13									

Table 3 shows the average results of each variable and the average results of each indicator tested on each respondent. Usability testing on Bali Tangi's web-based E-CRM is conducted using the usability testing method with the aim of assessing the ease and comfort of users when using the system. Testing is carried out on 15 respondents divided into two groups: admins and customers. Each respondent testing the system in the admin section performs testing for four role types in the system: main admin, sales staff, customer service, and manager.

The characteristics of the respondents include an age range of 25-39 years, both male and female, with the ability to understand the customer service process and conduct online transactions. Each respondent fills out a questionnaire with questions for each group representing ten indicators in usability testing after testing the system by performing the given tasks. The efficiency indicator has the highest value of 4.20, indicating that users overall feel efficient in using the system. The total average of all indicators shows a value of 4.13 with a satisfactory category.

**5. Conclusion**

The conclusion drawn from this research is that the development of a web-based E-CRM application at Bali Tangi is a solution to strengthen relationships and improve customer satisfaction. The system design begins with analyzing business needs based on the processes and phases present in CRM. System development is carried out using the PHP Laravel framework and MySQL database. The main features designed include product purchases on the website, providing reviews for purchased products, submitting complaints and questions via live chat, providing product coupons, sending newsletters, and customer reports grouped by characteristics. The system is also built by integrating Application Programming Interfaces

(APIs) into the e-mail marketing feature via Mailchimp to connect with customers and the payment gateway via Midtrans to handle payments during product transactions.

System testing using the black box testing method is conducted by testing each feature of the system from the admin and customer perspectives to determine the functionality of each feature. The results show that each feature performs well. System testing with usability testing method is conducted by collecting responses from respondents regarding the usability of the system after performing the given tasks. The results of the usability testing show that the developed system is in line with its function and is rated satisfactory for use by users, with an overall average score of 4.13.

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