

Brew Beauty e-Commerce System

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DOI: <https://doi.org/10.30880/aitcs.2025.06.01.045>

Article Info

Received: 14 June 2024

Accepted: 18 June 2025

Available online: 30 June 2025

Keywords

e-Commerce System, Web-Based Platform, Beauty Industry, Inventory Optimization, Customer Experience, Bussiness Growth, Online Sales

Abstract

The beauty and cosmetics industry in Malaysia, despite its substantial revenue growth, faces challenges such as manual inventory management, limited customer reach, and a lack of sales analysis tools. This paper proposes the development of an e-Commerce system for Brew Beauty, addressing these challenges. The system aims to streamline operations, enhance customer experience, and enable online sales. Key objectives include designing an object-oriented e-Commerce system, developing a web-based platform, and conducting thorough testing. The proposed system encompasses modules for registration, login, inventory management, advertisement, order processing, payment management, feedback collection, and sales reporting. The expected results include improved efficiency, increased sales, and enhanced data security. This project holds significance in modernizing business operations, promoting accessibility, and fostering growth in the beauty industry.

1. Introduction

The beauty and cosmetics industry in Malaysia has witnessed remarkable growth driven by evolving consumer preferences and a heightened focus on self-care and personal grooming. The beauty and personal care industry in Malaysia proved that beauty is more than skin deep, with a revenue of around 2.68 billion U.S. dollars in 2022 [1]. Despite this growth, challenges such as manual inventory management, limited customer reach, and a lack of sales analysis tools persist, hindering the full potential of businesses in this sector. This paper addresses these challenges through the proposition and development of an e-Commerce system for Brew Beauty, a local makeup shop managed by Mr. Razeeq. The aim is to leverage technology to enhance operational efficiency, customer experience, and online sales. The project's objectives include designing an object-oriented e-Commerce system, developing a web-based platform, and conducting thorough testing. By delving into the multifaceted issues faced by Brew Beauty, this project seeks to modernize business operations, improve accessibility, and contribute to the growth of the beauty industry.

In the subsequent sections, we delve into the specific literature review, methodology, system analysis and design and conclusion of the project.

2. Literature Review

In addition to evaluating the e-Commerce system and comparing it with existing solutions, a comprehensive literature review will be conducted to explore the latest advancements and best practices in the field.

2.1 e-Commerce System

E-Commerce, or electronic commerce, refers to the buying and selling of goods and services over the internet [2]. It essentially works as a website or application that makes buying easy. E-commerce systems play a crucial role in modern business, enabling timely communication with customers and efficient sales processes [3]. Users may browse a variety of things, put items they want in a virtual cart, and safely complete transactions without having to engage with the product in person. E-commerce is a web-based catalogue whereby buyers can possibly place orders and sellers can possibly accept payments [4]. This system isn't just about the operations that are visible on the front end, but it also coordinates a number of crucial back end features that are similar to a carefully tracking inventory, enabling safe payment methods, and managing orders to guarantee smooth operations for both buyers and sellers. Exceptionally well-equipped, it includes functions like order processing, inventory management, safe payment gateways, and customer feedback collection systems, all of which provide the technological foundation that makes online shopping convenient and efficient. The e-Commerce industry is growing exponentially, more e-Commerce businesses are emerging, and the digital economy is continuously expanding while reaching every corner of the world that has internet access. [5].

2.2 Comparison of the Existing System

This section compares the application's or system's features with the suggested system. Table 1 presents a comparison between the proposed system and the selected current system.

Table 1: Comparison of Existing System and Proposed System

Features	Breana Beauty	One Thing	Wardah Beauty	Brew Beauty e-Commerce System
Platform	web-based	web-based	web-based	web-based and mobile based
Register	Yes	No	Yes	Yes
Login	Yes	No	Yes	Yes
Manage Stock	Yes	Yes	Yes	Yes
Manage Advertisement	Yes	Yes	Yes	Yes
Manage Order	No	No	No	Yes
Manage Payment	Yes	No	No	Yes
Manage Feedback	Yes	No	No	Yes
Generate Report	Yes	No	No	Yes

In summary, the comparison of four beauty related platforms reveals common features such as web-based access, registration, login, stock and advertisement management, as well as payment and feedback systems. Breana Beauty and Wardah Beauty are established systems with comprehensive functionalities, while One Thing is a simpler platform lacking certain features. The proposed Brew Beauty e-Commerce System stands out by incorporating order management in addition to stock, advertisement, payment, feedback management, and report generation. This proposed system aims to provide a holistic e-Commerce solution, combining the strengths of existing platforms to offer a comprehensive and streamlined experience for beauty businesses.

3. Methodology

The prototyping model, as discussed by Rothenberg [6], is a form of evolutionary software development that uses prototypes as working models of a system. The prototyping phase is of particular importance within the context of an e-Commerce system development project. Following the requirement gathering stage where various solutions to address users' needs are brainstormed and refined, the prototyping phase allows for the creation of tangible representations of these proposed solutions. It constitutes a pivotal component of user experience (UX) design, following the requirement gathering phase where ideas conducive to addressing users' needs are generated and selected. This iterative approach ensures that the final e-Commerce system effectively addresses user needs and preferences, leading to enhanced user satisfaction and increased conversion rates. Given the dynamic nature of the makeup industry and the diverse needs of our users, employing a prototyping approach enables us to iteratively refine our platform's design and functionality to ensure optimal user engagement and satisfaction.

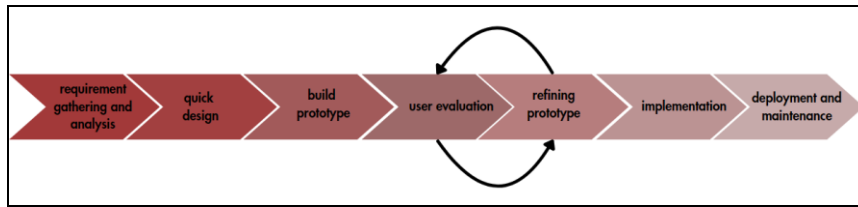


Fig. 1: Prototyping Methodology

3.1 System Development Workflow

The Prototyping model comprises seven distinct phases, each detailed in Table 2, outlining specific assignments and corresponding outputs essential for the entire project development process. The tables outline the software development process in seven phases which are requirement gathering and analysis, quick design, build prototype, user evaluation, refining prototype, implementation, deployment and maintenance. Initially, stakeholder discussions and document reviews identify system needs, producing a proposal. Quick Design involves creating UML diagrams, architecture, database tables, and interfaces, resulting in SRS and SDD documents.

The prototype is then developed with basic functionality and a system database, followed by user testing and iterative refinements to enhance usability. Implementation converts the prototype into a fully functional system with written code. Finally, the system is deployed to a live server, undergoing bug fixes, updates, and adaptation to requirements, supported by tools like Visual Studio Code, PHPMyAdmin, and GitHub.

Table 2: Software Development Activities and Task

Phase	Activities/Task	Work Product	Tool
Requirement Gathering and Analysis	<ul style="list-style-type: none"> • Discussion with stakeholder. • Identify existing problems of current system. • Determine the objectives, scope, and goal in the project. • Analyze requirement through stakeholder interview and document review. 	<ul style="list-style-type: none"> • Proposal 	<ul style="list-style-type: none"> • Interview (Google Meet) • Document Analysis
Quick Design	<ul style="list-style-type: none"> • Design UML diagrams. • Design architecture. • Design the database in table form. • Design interface of the system. 	<ul style="list-style-type: none"> • SRS • SDD • Wireframe 	<ul style="list-style-type: none"> • Draw.io • Wix
Build Prototype	<ul style="list-style-type: none"> • Develop a preliminary version of the system module with basic functionality. • Develop system database. 	<ul style="list-style-type: none"> • Module 1 • Module 2 • Module 3 • Module 4 • Module 5 • Module 6 • Module 7 • Module 8 • System database 	<ul style="list-style-type: none"> • Visual Studio Code • PHPMyAdmin
User Evaluation	<p style="text-align: center;">2 iterations of user evaluation and refining prototype</p> <ul style="list-style-type: none"> • Interface Testing. • Functional Testing. • Acceptance Testing. 	<ul style="list-style-type: none"> • Test case • Test report 	<ul style="list-style-type: none"> • User Testing Tools
Refining Prototype	<ul style="list-style-type: none"> • Refine the prototype iteratively to improve usability and functionality. 	<ul style="list-style-type: none"> • Module 1 • Module 2 • Module 3 • Module 4 • Module 5 • Module 6 • Module 7 • Module 8 • System database 	<ul style="list-style-type: none"> • Visual Studio Code • PHPMyAdmin

Table 2: [cont]

Iteration end	
Implementation	<ul style="list-style-type: none"> Change the prototype into a fully functional system. Writing code to build the software system.
Deployment and Maintenance	<ul style="list-style-type: none"> Upload to live server. System is delivered. Bug fixes. Feature updates and enhancements. Adaptation to changing requirements.

4. System Analysis and Design

The results of the requirement analysis lay the groundwork for a comprehensive system design. The functional requirements detail specific features, and the non-functional requirements ensure the system's operational efficiency, security, and user-friendliness in Brew Beauty e-Commerce System for eight modules. The use case diagram visually represents the interactions between the system and its users, providing a clear overview of the proposed system's functionalities. The general system architecture serves as the foundational blueprint for the Brew Beauty e-Commerce System. This section outlines the key components, their interactions, and the overall structure of the proposed system. The next steps in system development involve database design, which is class diagram, ensuring data elements are well-structured and defined.

4.1 Requirement Analysis

Functional requirements are features or functions of a system that must be implemented to enable the users to fulfill their tasks or business process.

4.1.1 Functional Requirement Analysis

Table 3: *Functional Requirement Analysis*

Modules	Functionalities
Register	<ul style="list-style-type: none"> The system shall allow the customer to register into the system by entering their name, email address, phone number, date of birth, gender, and password. The system should display error messages if the registration details are invalid or have an empty field. The registration functionality is crucial for customers intending to make purchases through the system. The system shall securely store and manage the provided user information for future interactions and transactions. The system should redirect the users to the homepage after registration.
Login	<ul style="list-style-type: none"> The system shall incorporate a login module enabling users to access the Brew Beauty e-Commerce System using their authorized email address and password. Unauthorized users attempting to log in shall be denied access to the Brew Beauty e-Commerce System. The system should verify the users email and password. The system should display error messages if the login details are incorrect or have an empty field. The system should redirect the users to the homepage if the user inputs valid email and password.

Table 3: *[cont]*

Manage Stock	<ul style="list-style-type: none"> • The system shall allow manager and staff with the ability to perform operations such as adding, editing, updating, and deleting products. • The system shall allow the manager and staff to monitor and record stock-outs, ensuring timely replenishment. The system shall support the identification and tracking of expired products, allowing employees to take appropriate actions, such as removal or replacement.
Manage Advertisement	<ul style="list-style-type: none"> • The system should allow customers with the ability to access and view the latest or upcoming sales promotions from Brew Beauty shop. • The system shall allow manager and staff the capability to update and modify promotions and discounts offered by Brew Beauty shop.
Manage Order	<ul style="list-style-type: none"> • The system should allow customers to search for products, view product information including descriptions, ingredients, way to use the product and add selected items to the shopping cart. • The system shall facilitate order customization by allowing customers to create a personalized Wishlist of products for future consideration. • The system should allow customers to review, edit, and delete the contents of their shopping cart including quantity before making payment. • The system shall allow the customer to view order status and order history. • The system shall allow manager and staff to update order status and handle customer orders.
Manage Payment	<ul style="list-style-type: none"> • The system shall enable customers to complete the checkout process for desired products by entering their delivery address. • The system shall allow customers to have the capability to apply promotional codes to avail discounts on their purchases. • The system shall provide customers with the option to choose their preferred payment method, including online banking, credit, and debit cards. • The system shall facilitate secure online transactions, ensuring the confidentiality and integrity of customer payment details. • The system shall allow customers to receive confirmation of successful payments and a detailed receipt for their transactions.
Manage Feedback	<ul style="list-style-type: none"> • The system shall permit customers to write and submit reviews and rating for each product. • The system shall allow manager and staff to access, view, and collect customer feedback. • The system shall display customer reviews alongside product listings to aid potential buyers in their decision-making process.
Generate Report	<ul style="list-style-type: none"> • The system shall allow managers with the capability to oversee and manage sales reports for specified time periods. • The system should display overall sales, total product, total orders and total sales of the day.

4.1.2 Non-Functional Requirement Analysis

Non-functional requirements, also known as quality requirements, describe how a system must behave and its quality attribute.

Table 4 *Non-Functional Requirement Analysis*

Requirements	Description
Operational	<ul style="list-style-type: none"> • The system shall be easy to use. • The system should be able to work with web browser such as Google Chrome.

Table 4: [cont]

Performance	<ul style="list-style-type: none"> All interactions between the user and the system should take more than three seconds. The system should work well by quickly dealing with what users ask for, handling transactions fast, and staying responsive even when many people are using it a lot. This ensures users have a good experience.
Security	<ul style="list-style-type: none"> The system shall deny access to any user if the email and password is incorrect. Customers must register their account before making a purchase.
Usability	<ul style="list-style-type: none"> The system shall provide an intuitive and user-friendly interface, ensuring that users can easily navigate and interact with the system.
Integrity	<ul style="list-style-type: none"> The email and password stored in the database should be encrypted

4.2 Unified Model Language (UML)

UML, or Unified Modeling Language, is a standardized method for modeling software systems, developed by the Object Management Group [7]. UML employs various diagrams, such as class diagrams to illustrate the static and dynamic aspects of a system.

4.2.1 Use Case Diagram

Fig 2 outlines the use case diagram of Brew Beauty e-Commerce System. There are a total of eight modules that would be implemented into the system which are register, login, manage stock, manage advertisement, manage order, manage payment, manage feedback, and generate report.

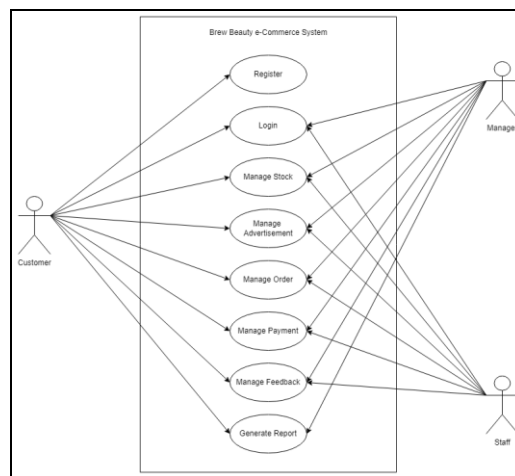


Fig.2 Use Case Diagram of Brew Beauty e-Commerce System

The register module is only for customers and login modules are for all the three users which are customers, manager and staffs. Following login, users are directed to their respective homepages based on their user type. The manage stock module empowers staff to handle product tasks, including addition, editing, updating, and deletion, while tracking stock-outs and expired products.

Furthermore, the manage order module streamlines customer orders, offering features like viewing order history and real-time tracking. Manage payment ensures a convenient checkout with promo code application and preferred payment methods. The manage feedback module allows customers to provide reviews, while managers analyze and collect feedback. Manage advertisement informs customers about latest or upcoming promotion, and generate report lets managers view sales reports, creating an efficient e-Commerce system.

4.3 Class Diagram

This concise overview outlines the essential functions of each table, providing a comprehensive understanding of the system's structure and capabilities.

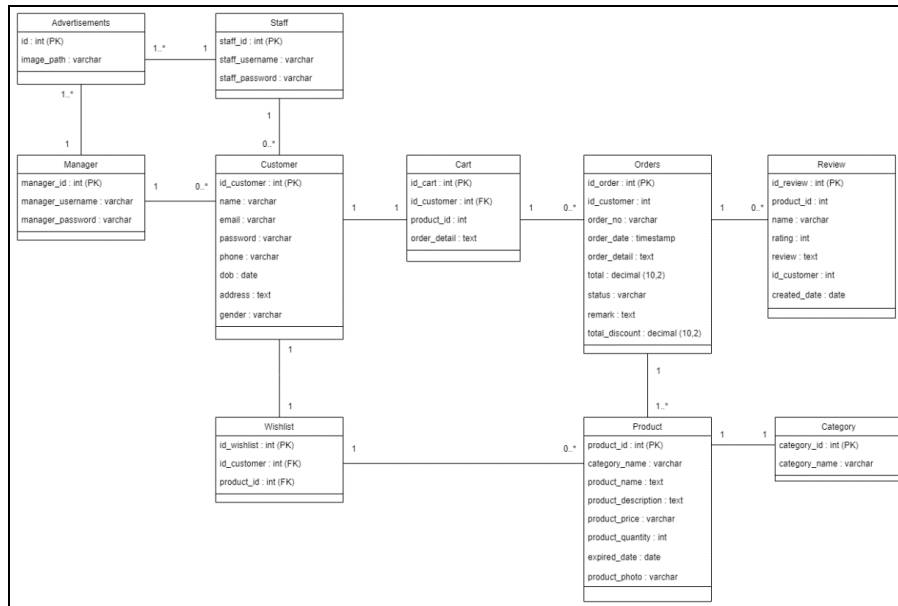


Fig. 4 Class Diagram of Brew Beauty e-Commerce System

There are 10 entities inside the class diagram, which are Customer, Product, Category, Manager, Staff, Advertisements, Cart, Orders, Review and Wishlist.

Table 5 Data Dictionary of Class Diagram for Brew Beauty e-Commerce System

Table	Attributes
Customer	id_customer(PK), name, email, password, phone, dob, address, gender.
Product	product_id(PK), category_name, product_name, product_description, product_price, product_quantity, expired_date, product_photo.
Category	category_id (PK), category_name.
Manager	manager_id(PK), manager_username, manager_password.
Staff	staff_id(PK), staff_username, staff_password.
Advertisements	id(PK), image_path.
Cart	id_cart (PK), id_customer(FK), product_id, order_detail.
Orders	id_order(PK), id_customer(FK), order_no, order_date, order_detail, total, status, remark, total_discount, discount.
Review	id_review(PK), product_id(FK), name(FK), rating, review, id_customer, created_date.
Wishlist	id_wishlist(PK), id_customer(FK), product_id(FK).

5. Implementation and Testing

In this section, a detailed overview of the various interfaces within the Brew Beauty e-Commerce System. For this Brew Beauty e-Commerce System contains eight modules which are register, login, manage stock, manage advertisement, manage order, manage payment, manage feedback and generate report. Fig. 5 illustrates the register page and login page.

5.1.1 Register Module Page

Fig 5 illustrates the Register Page for customer, this form is designed for new users to input their details and create an account. It comprises fields for essential information including name, mobile phone, email, gender, date of birth and password. Upon completing these fields, users can submit their information by clicking the register button.

Fig. 5 Register Page for Customer

5.1.2 Login Module Page

Fig 6 shows the login page for customers, manager and staff. This form is designed for users to input their credentials and access their account. It includes fields for email and password, with a login button to submit the information. Fig 7 illustrates forgot password page, if a user forgets their password, they can click the forgot password link to initiate the reset process. Users can regain access to their account by entering their mobile phone, email and a new password.

Fig. 6 Customer Interface (a) Login Page; (b) Forgot Password Page

5.1.3 Manage Stock Page

Fig 7 showcases the Manage Stock Interface designed for managers and staff. This interface allows users to oversee and manage the product inventory effectively. The interface displays a comprehensive product list with columns for product photo, product name, category, price, quantity, expiry date, and description. Manager and staff can use this interface to add new products, update existing product details, delete products, and manage stock levels to ensure accurate inventory tracking. In the actions button has two choices which are to update the product details or to remove the product. By clicking the dustbin icon, a confirmation message will be prompted to verify whether the user intends to delete the product or not.

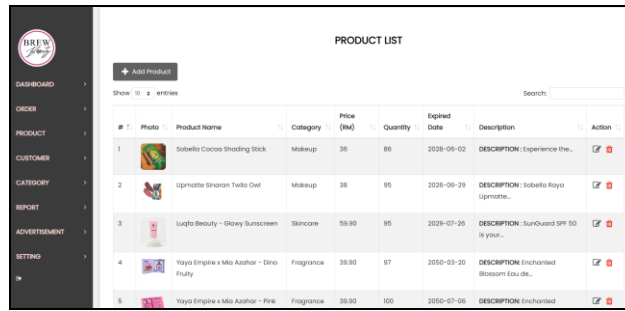


Fig. 7 Manage Stock Page for Manager and Staff

Fig 8 illustrates the product page for customers on the Brew Beauty e-Commerce system. It features a search bar, category filters, and displays products with images, names, prices, and add to bag buttons for easy purchasing. The add to bag button will redirect to cart page. Customers can also click the heart symbol to put the product into wishlist page.

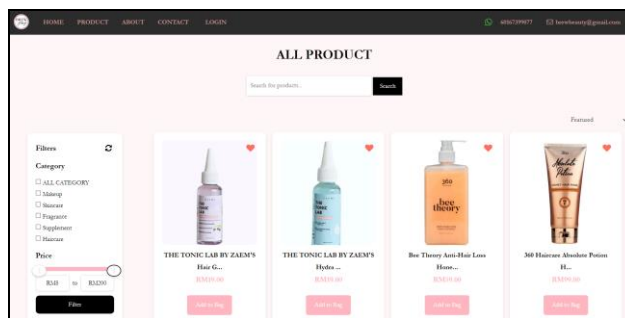


Fig. 8 Product Page for Customer

5.1.4 Manage Advertisement Page

Fig 9 displays the Manage Advertisement Interface intended for managers and staff. This interface facilitates the management of advertisements displayed on the platform. Users can upload new advertisements by selecting a file and clicking the upload button. Additionally, users can click the delete button to remove existing advertisements from the platform.

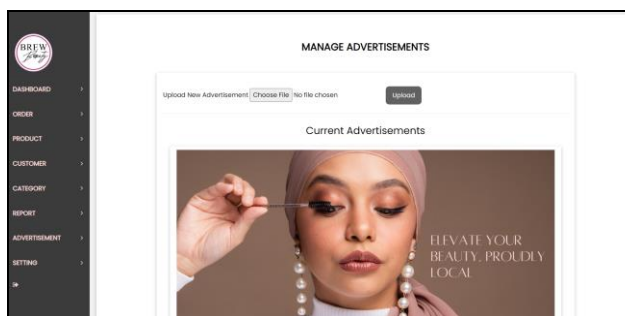


Fig. 9 Manage Advertisement Page for Manager and Staff

Fig 10 illustrates homepage for customer that display advertisement uploaded by manager and staff. Customer can click the shop now button and it will redirect to product page.

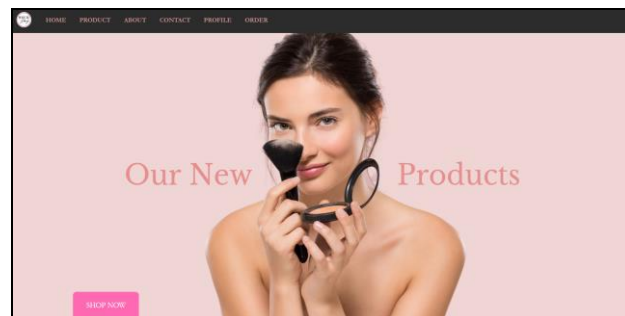


Fig. 10 Home Page for Customer

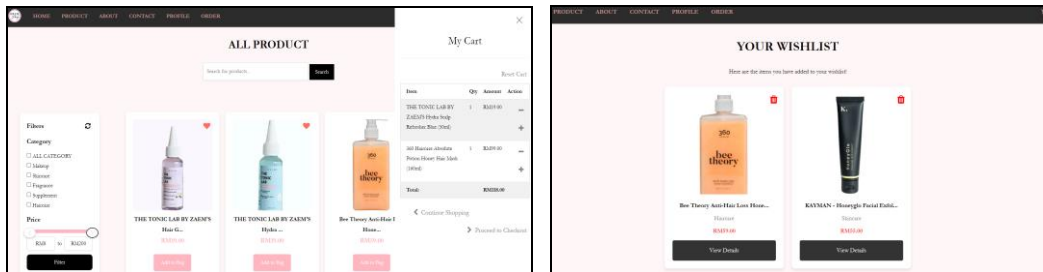
5.1.5 Manage Order Page

Fig 11 displays the Manage Order Interface designed for managers and staff. This interface allows users to view and manage customer orders efficiently. The interface includes a detailed list of customer orders with columns for order date, customer, order number, order detail, total, status, and remark. Managers and staff can utilize this interface to track and update order status, ensuring a smooth order processing workflow. The columns can be sorted to organize the orders based on different attributes such as date, order number or status. It is useful for prioritizing orders that need immediate attention.

Fig 12 (a) illustrates the cart page of the customer interface. It shows the selected products in the shopping cart, each with an image, name, and price. There are options to adjust the quantity or reset cart. This page provides a summary of the total cost and a button to proceed to checkout. Users can continue shopping or view detailed information about each product by clicking the respective buttons. Fig 12 (b) displays wishlist page, where users can see items they have saved for future purchase. Each product is presented with an image, name, and options to view its details. The remove button allows users to delete items from their wishlist.

Order #	Date	Customer	Order No	Order Detail	Total (RM)	Status	Remark	Action
1	2024-05-04 04:24:24	afm afm@algalmatic.com	52911	Isolate Cocoa Shading Stick x 1	30.00	Pending	6502276489222	🗑️
2	2024-05-04 03:02:05	afm afm@algalmatic.com	52330	Isolate Cocoa Shading Stick x 1	32.40	Pending	8988147622227	🗑️
3	2024-05-04 03:02:44	afm afm@algalmatic.com	95395	Lip Matte Dark Jelly Sockles - Overlocking 18181 x 1	34.20	Pending	03642255037038	🗑️
4	2024-05-	afm afm@algalmatic.com	48787	Voxy Empire x Mio Acahar -	39.90	Pending	6248274227768	🗑️

Fig. 11 Manage Order Page for Manager and Staff



(a)

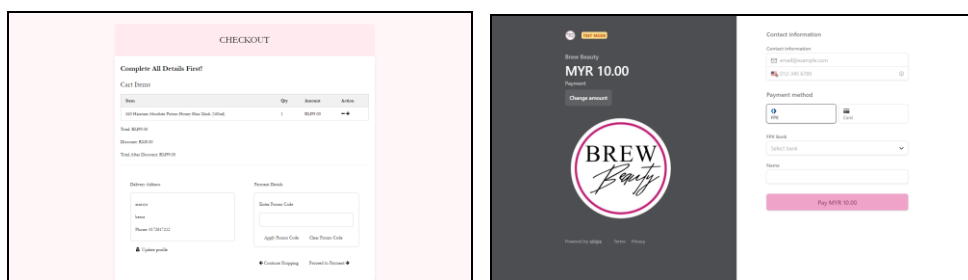
(b)

Fig. 12 Order Page for Customer (a) Cart Page; (b) Wishlist Page

5.1.6 Manage Payment Page

Fig 13 depicts the payment page for customers. Fig 13 (a) illustrates a checkout page for customers which allows customers to review their order before making payment. Customer can enter promocode to get discount before proceeding to payment.

Fig (b) is designed to facilitate the payment process for customers making purchases on the Brew Beauty platform. The payment amount is prominently displayed, with an option to change the amount if necessary. Customers can select their preferred payment method from two options which are online banking or card. For online banking, customers need to select their bank from a dropdown list that displays a variety of types of banks. If customers choose to pay by card, they must fill in the required card details, including the card number, CVV, and expiration date.



(a)

(b)

Fig. 13 Payment Page for Customer (a) Checkout Page; (b) Payment Page

5.1.7 Manage Feedback Page

Fig 14 shows the feedback interface for customers, designed for easy product reviews. This feedback page is only displayed after the order has been delivered to the customer. Customers enter the order number, select the product from a dropdown menu, rate it using a star system, and provide written feedback in a text area. Finally, they submit their review by clicking the submit review button. This streamlined interface facilitates efficient and detailed feedback submission.



Fig. 14 Feedback Page for Customer

5.1.8 Generate Report Page

Fig 15 shows the Generate Report Interface intended for managers. This interface allows managers to generate sales reports over a specified time. The interface includes options for selecting the date range, and upon generating the report, it displays a graphical representation of the sales data. Fig 16 illustrates dashboard page for manager and staff, it displays total product, total of pending orders, delivered orders, overall sales, total customers, total orders and total sales by day.

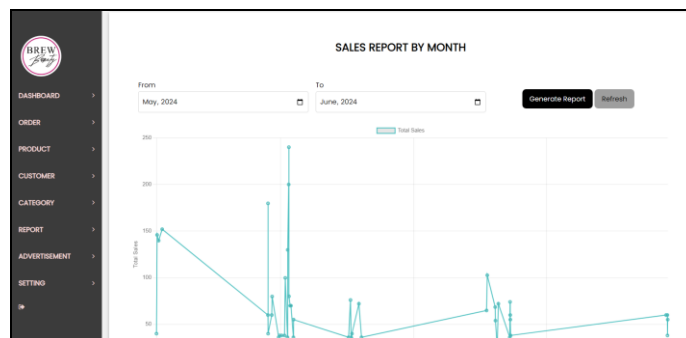


Fig. 15 Report Page for Manager

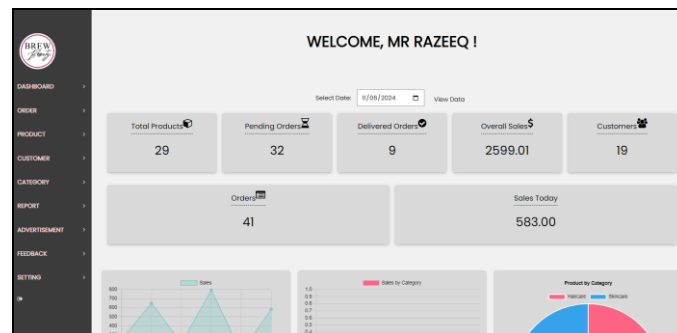


Fig. 16 Dashboard Page for Manager and Staff

6. Testing

In this section delve into the world of testing in software development, focusing on the essential aspects to ensure reliable, high-quality, and secure software systems. There were two tests which user acceptance testing and system testing.

6.1 Test Plan

Table 6 shows the test plan for a Brew Beauty e-Commerce System which verified critical functionalities, all of which passed successfully. Customers can register by entering personal details and log in using their email and password. Managers and staff can manage stock and advertisements effectively. The system supports order management, allowing customers to make purchases, add items to the cart, and wishlist. Payment processing through online banking or credit/debit cards was confirmed to work correctly. Customers can provide product reviews and ratings, and managers can generate and manage sales reports and performance analysis, ensuring a reliable e-Commerce system.

Table 6 Test Plan of Brew Beauty e-Commerce System

Test Plan	Expected	Result
Register	Customer can register into the system by entering their name, email, mobile phone, date of birth, gender, and password.	Pass
Login	Users can login into the system after entering their valid email and password.	Pass
Manage Stock	Manager and Staff can add, update, edit, and delete product details.	Pass
Manage Advertisement	Manager and Staff has capability to upload and delete advertisement.	Pass
Manage Order	Customer can make purchase, add to cart and add to wishlist.	Pass
Manage Payment	Customer can make payment through online banking or credit/debit card.	Pass
Manage Feedback	Customer can give review and rating for the product.	Pass
Generate Report	Manager can manage sales report and view performance analysis.	Pass

6.2 User Acceptance Testing

User acceptance testing (UAT) is when subjects selected from a target audience interact with a product or feature under real-world circumstances [8]. User acceptance testing ensures that the application meets the end user's needs. The testing was conducted for the Brew Beauty e-Commerce system using the form as attached in appendix, to ensure that the developed solution meets the business requirements and end-user expectations. The stakeholders and end users participated in a structured testing process, following a detailed user acceptance testing plan. It executed predefined test scenarios and test cases designed to cover all eight critical modules of the system.

6.3 Requirement Testing

In this section, the summary of all test results is discussed. The system underwent rigorous testing across eight modules, encompassing a total of 76 test cases. Each module, including register, login, manage stock, manage advertisement, manage order, manage payment, manage feedback, and generate report, had its respective functionalities thoroughly tested. All test cases were executed successfully, however there was one failure in the manage advertisement module, demonstrating the need for further refinement before deployment. The successful execution of all others test cases confirms that the brew beauty e-Commerce system meets its specified requirements and is ready for deployment.

Table 6 Overall Test Result of Test Cases

Test Cases	Total Test Cases	Total Success	Total Failed
TC_100	8	8	-
TC_200	8	8	-
TC_300	10	10	-
TC_400	5	4	1
TC_500	17	17	-
TC_600	11	11	-
TC_700	11	11	-
TC_800	6	6	-
Total	76	75	1

7. Conclusion

The implementation of the Brew Beauty e-Commerce system has significantly enhanced operational efficiency and customer experience by optimizing inventory management, promoting products and sales events effectively, facilitating a seamless shopping experience, providing critical sales performance insights for managers, and improving overall customer experience with diverse payment options. However, the system has limitations,

including the necessity for a stable internet connection, lack of mobile platform integration, potential performance issues during high traffic, inconsistent performance across browsers and devices, and limited payment methods. Future enhancements are proposed to address these limitations, such as implementing offline functionality, developing a mobile application, upgrading system architecture for scalability, ensuring cross-browser and device compatibility, and expanding payment options to include digital wallets and international methods.

Acknowledgement

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

This journal mandates that all authors publicly acknowledge their responsibilities for the content of the submitted work. The contributions of the authors to the development of the Brew Beauty e-Commerce System are delineated as follows: study conception and design - Nur Atiqah Binti Mohd Radzuan, Mohd Zainuri Bin Saringat; data collection - Mohd Zainuri Bin Saringat; analysis and interpretation of results - Nur Atiqah Binti Mohd Radzuan, Mohd Zainuri Bin Saringat; draft manuscript preparation - Mohd Zainuri Bin Saringat. All authors actively participated in the review of the results and provided approval for the final version of the manuscript.

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Appendix A: User Acceptance Testing Form

User Acceptance Testing (UAT)				
Brew Beauty e-Commerce System				
System Admin User: En Razeeq				
Position: Manager				
Business Name: Brew Beauty				
No	Module/Acceptance Criteria	Test result		Comment
		Pass	Fail	
Login Module				
a)	Display login page for login purpose by entering username and password.	/		
b)	I able to go to dashboard of the system.	/		
c)	Error message shown if wrong credential been entered.	/		
Manage Stock				
a)	Display manage stock page to view list of product.	/		
b)	I able to add, edit, update and delete the product details.	/		
c)	I can track if the quantity of product is in low of stock.	/		
Manage Advertisement				
a)	Display manage advertisement page.	/		
b)	I able to upload and delete the advertisement.	/		
Manage Order				
a)	Display manage order page.	/		
b)	I able to view list of customer's order and update their status.	/		
Manage Payment				
a)	I able to view customer's total order and track sales.	/		
Manage Feedback				
a)	Display manage feedback page.	/		
b)	I able to view and delete customer's feedback on selected product.	/		
Generate Report				
a)	Display and generate report in pdf format.	/		
b)	I can choose by month to view report of sales.	/		
I am _____ Razeeq _____ hereby declare that the information provided is true and correct.				
Agreed by, _____			Witnessed by, _____	
Name: _____			Name: _____	
Position: Manager			Position: Staff	
Date: 8 June			Date: 8 June 2024	

Fig. A.1 User Acceptance Testing for Manager

User Acceptance Testing (UAT)


Brew Beauty e-Commerce System

System Admin User: Nur Aimi Binti Mustapa
 Position: Customer
 Business Name: -


No	Module/Acceptance Criteria	Test result		Comment
		Pass	Fail	
Register Module				
a)	Display register page for sign up for a new account.	/		
b)	I able to create an account by entering all the registration details.	/		
c)	I able to get email notification that I success to registered to the system.	/		
Login Module				
a)	Display login page for login purpose by entering email address and password.	/		
b)	I able to go to dashboard of the system.	/		
c)	Error message shown if wrong credential been entered.	/		
Manage Stock				
a)	Display product page that I can search and filter what product to view.	/		
b)	I able to choose product to add to cart and add to wishlist.	/		
c)	Display product description and review.	/		
Manage Advertisement				
a)	Display advertisement image at homepage.	/		
Manage Order				
a)	Display order history page.	/		
b)	I able to place an order and also, I can track the order using tracking number given.	/		
Manage Payment				
a)	I able to make payment via online banking and credit/debit card.	/		
b)	I able to download the receipt.	/		
Manage Feedback				
a)	Display gives feedback page.	/		
b)	I able to give review and rating for the product I bought.	/		

I am Nur Aimi hereby declare that the information provided is true and correct.

Agreed by, Witnessed by,



 Name: Nur Aimi
 Position: -
 Date: 4 June 2024



 Name: Arnisya
 Position: -
 Date: 4 June 2024

Fig. A.2 User Acceptance Testing for Customer