

VIETNAM NATIONAL UNIVERSITY - HO CHI MINH CITY
UNIVERSITY OF ECONOMICS AND LAW



**FINAL PROJECT REPORT
BUSINESS WEBSITE DEVELOPMENT**

TOPIC:

**BUILDING DEVELOPMENT AN E-COMMERCE WEBSITE FOR
BUSINESS REBOUND PIERCING**

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Ho Chi Minh City, 15/03/2025

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ACKNOWLEDGEMENT

We would like to express our sincere gratitude to the University of Economics and Law for offering the "Business Website Development" course. This course has provided us with valuable knowledge and a deeper understanding of the importance of this field in the context of the digital economy. We also wish to thank the university for providing access to excellent resources and facilities, which played a significant role in the successful completion of this project.

We are especially grateful to Mr. Tran Duy Thanh for his unwavering support and insightful guidance throughout the course. His lectures and practical exercises enabled us to apply theoretical knowledge to real-world situations, and we truly appreciate the time and effort he invested in our learning.

Finally, we extend our appreciation to everyone who supported us throughout this process. Completing this report has been a rewarding learning experience, and we look forward to applying the knowledge gained in future academic and professional endeavors. We acknowledge that there may be areas for improvement in our work and welcome any constructive feedback.

Thank you once again to all who contributed to our journey.

Ho Chi Minh City, January 17th, 2025

Students' Group

COMMITMENT

Our team affirms that the project titled "Development of an E-Commerce Website for Piercings Jewelry & Services" is an independent research initiative undertaken by us. This project has been conducted under the expert guidance and supervision of Ph.D. Tran Duy Thanh at Ho Chi Minh City University of Economics and Law.

We acknowledge that the work presented in this report is original and based on our own research, design, and development efforts. All relevant sources of information, ideas, and concepts drawn from external references have been properly cited and acknowledged in accordance with academic standards.

We also confirm that this report has not been previously submitted for any other academic or professional purposes, and all work contained herein is the result of our independent study and team collaboration. We understand the importance of academic integrity and take full responsibility for the content and findings presented in this report.

ABSTRACT

This website is designed for the imaginary brand Rebound Piercing, offering piercing products and services. Built using Angular, MongoDB, Node.js, and HTML, the platform provides a seamless experience for users to purchase products and book piercing appointments. The user-friendly interface allows customers to easily view and select products, choose services based on criteria like price, and make appointments.

The site includes functions for viewing products, managing order history, adjusting the cart, processing payments, and handling customer service inquiries. A landing page highlights promotional sales, new collections, and other updates. These features aim to deliver a comprehensive experience for customers, ensuring satisfaction both in-store and online.

On the technical side, the back-end is built with Node.js and MongoDB, offering scalability and efficient data management, particularly with high transaction volumes. Angular and HTML power the front-end, ensuring a modern, flexible interface with smooth interactions and consistent performance across various devices.

Through this website, we hope to create a dynamic, interactive experience that not only fulfills the practical needs of our customers but also fosters an emotional connection with the Rebound Piercing brand. By offering a seamless and enjoyable online shopping journey, we aim to strengthen customer loyalty, elevate the brand's reputation in the digital space, and empower users to explore their unique style through our curated products and services. The goal is to blend convenience with creativity, ensuring customers feel confident and satisfied with both their purchases and the services they receive.

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LIST OF ABBREVIATION

| Abbreviation | Meaning |
|---------------------|------------------------------------|
| BPMN | Business Process Modeling Notation |
| DFD | Data Flow Diagram |
| UI | User Interface |
| FAQ | Frequently Asked Questions |
| DB | Database |
| CSS | Cascading Style Sheets |
| HTML | HyperText Markup Language |
| JS | JavaScript |
| VS Code | Visual Studio Code |
| API | Application Programming Interface |
| SQL | Structured Query Language |
| NoSQL | Not only SQL |
| JSON | JavaScript Object Notation |

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CHAPTER 1:PROJECT OVERVIEW

1.1 Problem Statement

The global body piercing jewelry market is rapidly expanding, driven by Gen Z's view of piercings as a form of self-expression and individuality. Valued at \$8.15 billion in 2024, the market is projected to grow at a CAGR of 6.14%, reaching \$10.89 billion by 2031.



Figure 1: Body Piercing Jewelry Market Share (%) by Region (2019-2031) (Source: Authors)

In Vietnam, this trend mirrors global patterns, with body piercings gaining popularity among youth, especially students, who view them as an essential aspect of self-expression. Rebound Piercing's survey revealed that 80% of respondents, primarily aged 19-21, have tried piercing, with 90% identifying as students who prioritize design and quality.

Bạn đang là:

60 câu trả lời

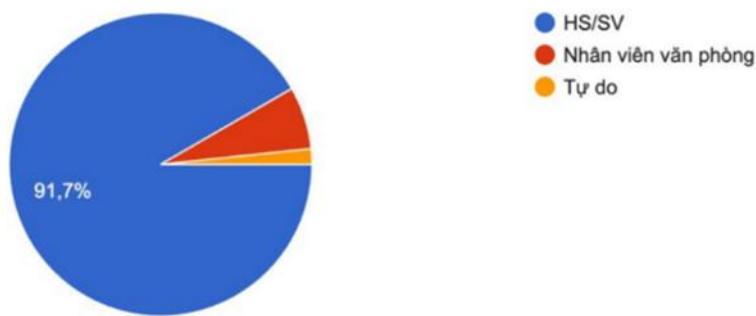


Figure 2: The age of people attended the survey (Source: Authors)

Bạn chọn khuyên xỏ dựa trên tiêu chí gì?

60 câu trả lời

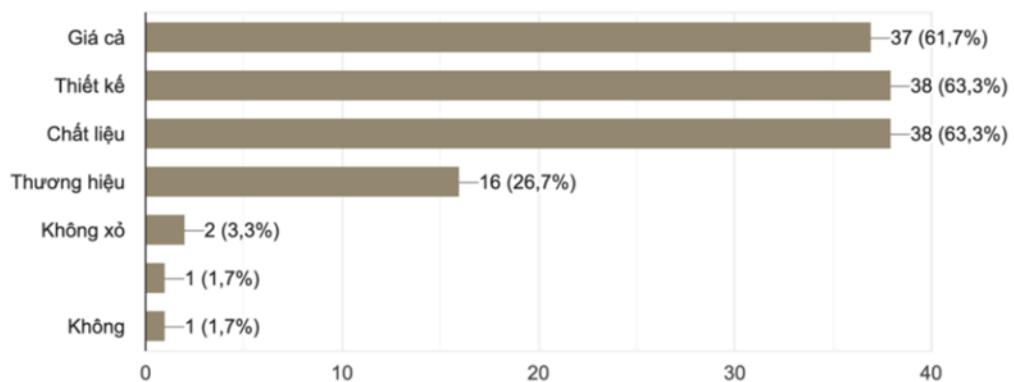


Figure 3: Key Criteria People Consider When Choosing Piercings (Source: Authors)

The market faces challenges such as a lack of professional, medically-standardized piercing services, leading to hygiene issues and eroded consumer trust. Rebound Piercing is uniquely positioned to meet the demand for safe, high-quality, and stylish piercing experiences, especially among younger consumers. This project aims to create a professional website that highlights the brand's premium products and services. With a user-friendly design, secure purchasing, and efficient booking features, the website will enhance customer trust and satisfaction while supporting Rebound Piercing's growth and market expansion.

1.2 Competitor website analysis

1.2.1. Related website comparison

| Website | COCKSTOCK Piercing & Aftercare | Piercing World | Gauges Piercing |
|-----------------|--|--|---|
| Website logo |  |  |  |
| Website Traffic | <ul style="list-style-type: none"> - Website: 77.55k visits/13rd March 2025 - Pages/Visit: 1.07 | <ul style="list-style-type: none"> - Website: 2.3k visits/13rd March 2025 - Pages/Visit: 1.92 | <ul style="list-style-type: none"> - Website: 523 visits/13rd March 2025 - Pages/Visit: 3.39 |
| Advantages | <ul style="list-style-type: none"> - The website, with its primary colors of white and orange, is eye-catching for first-time visitors. - Information on prices and product names is clearly displayed, with simple but appealing images. - The website layout is easy to view and doesn't feel overly information-heavy. | <p>The website features a warm and sophisticated color scheme with orange and beige tones, creating a cohesive brand identity.</p> | <p>The website features an impressive black background with neon and white accents, creating a stylish and modern look that appeals to younger audiences.</p> |

| | | | |
|----------------------|--|--|---|
| Advantages | <p>Professionally designed images contribute to strong brand recognition, while well-crafted blog content provides valuable information to customers. Pricing is clearly displayed, ensuring transparency.</p> | <p>The website provides realistic product images, enhancing customer trust.</p> | <p>Its simple and well-structured layout ensures easy navigation, with a strong focus on high-quality product images that enhance visual appeal, making it well-suited for the fashion and accessories industry. Transparent pricing further builds trust with customers.</p> |
| Disadvantages | <p>The lack of a fixed header makes navigation difficult, and the homepage layout is unclear, prioritizing blog posts over products, which diminishes its effectiveness as an e-commerce site. Additionally, the font and text colors blend into the background, making readability challenging, and the product search function is not optimized.</p> | <p>Lack of investment in both content and visuals, reducing its overall appeal. The layout is cluttered, with poorly organized information that makes navigation difficult. Additionally, the header contains too many sections, making it overwhelming, and the uniform font makes it hard to distinguish different categories. The homepage prioritizes excessive information instead of focusing on key product</p> | <p>Inconsistent typography affects design consistency and professionalism.</p> |

| | | | |
|--|--|----------|--|
| | | details. | |
|--|--|----------|--|

Table 1: Related Website Comparison (Source: Authors)

1.2.2. Related website functionalities comparison

| Functions | Content | COCKSTOCK Piercing & Aftercare | Piercing World | Gauges Piercing |
|----------------------------|---|--------------------------------------|-------------------|--------------------|
| Log in/ Sign up | | No | Yes | No |
| Banner | Engaging, brand message | Yes | No | Yes |
| Searchbar | Find products | Yes | Yes | Yes |
| Introduction Page | Detailed information about the brand's story, vision, mission, etc. | Yes | Yes | Yes |
| Homepage | Basic description and content related to the website. | Yes | Yes | Yes |
| News, event | Information about products, promotions, upcoming events,etc. | Yes | No | Yes |
| Product | Display product list, category: full image, price, ingredients, | Yes | Yes | Yes |

| | | | | |
|-----------------------------|--|-----|-----|-----|
| | description, etc. | | | |
| Filter | Filter by price, product, type, etc. | Yes | Yes | Yes |
| Review Product | Add product to cart, check, customize quantity | No | No | No |
| Policy | Provide full information on sales, delivery, and return policies | No | No | No |
| Online payment | Integrate online payment methods such as Momo, ZaloPay, ... | No | No | No |
| Chatbox | Customers and businesses communicate with each other | No | No | No |
| Link to social media | Link to social networking sites. | Yes | Yes | Yes |
| Responsive | Compatible with multiple devices | Yes | Yes | Yes |

Table 2: Related Website Functionalities Comparison (Source: Authors)

1.3 Scope and Object of the Topic

1.3.1. Scope

Our team will analyze and develop the Rebound Piercing website for both customers and store administrators. Customers will have a seamless experience with easy access to browse products, book appointments, register, and log in to the system, ensuring fast and convenient ordering and payment processes. Administrators will be equipped with a comprehensive admin page to manage product listings, track orders, as well as access customer information and process orders efficiently. The admin dashboard will display key information, providing managers with a quick overview of the store's performance and current status.

1.3.2. Object

- User Interface (UI): The UI of the Rebound Piercing website will be visually appealing, aligning with the brand's premium aesthetic while maintaining a user-friendly design. The website will feature a modern and sleek layout, ensuring ease of navigation and delivering a smooth user experience. Quick search functionality, simplified shopping cart management, and convenient payment options will be key features to enhance the customer journey.
- Functionality: In the initial phase, our focus will be on creating the essential features of the online store, such as browsing, booking appointments, and secure payment methods. We will then continue to refine and add advanced features, including personalized product recommendations, flexible search filters, and customizable jewelry options, to meet the evolving demands of customers and stay ahead in the competitive market.
- The Goal of the Project: The primary goal of the project is to create a website that provides a seamless and intuitive shopping and booking experience for Rebound Piercing's customers. By using modern web technologies, including MongoDB and NoSQL, the website will adhere to contemporary design standards, ensuring high performance and security. This platform will not only improve customer satisfaction but also drive Rebound Piercing's growth by reaching a broader audience and enhancing brand engagement.

1.4 Proposed functions for the project website

The group has developed the best ideas for structuring the website's components based on the functionality outlined above:

- Organize website content to ensure users can easily search for and access products, services, and information.
- Enhance website functionality to improve accessibility and streamline the user experience.
- Clearly present product details, service offerings, and company information to effectively communicate the brand's mission.
- Prioritize customer experience by focusing on intuitive navigation, seamless transactions, and engaging content.
- Design a visually appealing interface using high-quality images, an elegant layout, appropriate fonts, and smooth effects.
- Learn from existing e-commerce and service websites to retain beneficial features while avoiding common drawbacks.

Additionally, our website will feature the following sections and functions:

- Main Page Sections: Homepage, Contact Us, Payment Information, Shopping Cart, Blog, Service Booking, Product Listings, Product Details, Login / Sign In / Sign Out, My Profile, FAQs.
- Website Functions: Product Ordering, Product Filtering, Product Searching, View Order History, Payment Processing, Service Booking (Piercing, Aftercare), Rescheduling & Cancellations for Services, Blog Viewing, Popup Registration, FAQs Viewing, Customer & Admin Account Management, Order Validation & Processing

1.5 Rebound overview

1.5.1 Rebound overview

1.5.1.1. About brand

Rebound Piercing is a premium piercing brand based in Ho Chi Minh City, Vietnam, offering both online and offline services. Rebound specializes in high-quality piercing services, expert aftercare, and a curated collection of designer earrings.

The name "Rebound" represents resilience—the ability to overcome challenges and emerge stronger. It symbolizes the pursuit of new experiences, fresh perspectives, and personal transformation.

1.5.1.2. Vision

Rebound Piercing aims to be Ho Chi Minh City's top provider of high-quality piercings and jewelry, setting industry standards for safety and aesthetics. With a focus on building a skilled, certified team, Rebound prioritizes professionalism and top-tier service. The brand envisions nationwide expansion, offering unique, premium jewelry and piercing services across Vietnam.

1.5.1.3. Mission

The mission of Rebound Piercing is to honor beauty and individuality through the art of piercing, providing customers with a unique shopping experience and high-quality products.

1.5.1.4. Business model



Figure 4: Rebound Piercing Business Model (Source: Authors)

1.5.1.5. Revenue model

| Category | Estimated Cost (VND) |
|--|----------------------|
| Website Development (Front-end, Back-end, Database Setup) | 20,000,000 |
| Domain & Hosting (Annual cost) | 3,000,000 |
| Security & Maintenance (SSL, Updates, Bug Fixes) | 5,000,000 |
| Third-Party Integrations (Payment Gateways, Social Media) | 7,000,000 |
| Marketing & Branding (SEO, Ads, Social Media Campaigns) | 10,000,000 |
| Product Photography & Content Creation (Images, Blog Articles) | 5,000,000 |
| Miscellaneous & Contingency Fund | 10,000,000 |

| | |
|-----------------------------|-------------------|
| Total Estimated Cost | 60,000,000 |
|-----------------------------|-------------------|

Table 3: Rebound Piercing Revenue Model (Source: Authors)

1.5.1.6. SWOT

| Strengths | Weaknesses |
|--|---|
| <ul style="list-style-type: none"> - Unique, self-designed piercings. - Comprehensive piercing services. - Collaboration with a team of reputable doctors. - A wide range of product designs and piercing services that prioritize safety, with pricing options from midrange to high-end, catering to various customer needs. - Launching new collections every 6 to 12 months to maintain innovation and align with piercing services. - A dedicated team of highly skilled, certified piercers. | <ul style="list-style-type: none"> - As a new business, it has yet to reach a broad range of customer segments. - Faces challenges in competing with long-established piercing businesses. - Social media channels currently have low brand awareness. - Product designs, manufactured products and services' prices may limit the customer base. The use of materials like gold, silver, and titanium also restricts supply options and requires substantial capital for processing. |
| Opportunities | Threats |
| <ul style="list-style-type: none"> - Vietnam's young population structure, with 69.3% aged 15 to 64, shows a strong interest in piercings. - Improved standards in medical care. - Young people's increasing interest in beauty, creativity, and individuality is expanding the market for the piercing | <ul style="list-style-type: none"> - Piercing remains a sensitive topic in Vietnam, particularly in rural and mountainous areas, where some people still hold misconceptions that piercings are inappropriate and could impact a person's destiny. - Vietnam's piercing industry lacks a |

| | |
|--|---|
| <p>industry.</p> <ul style="list-style-type: none"> - Currently, there are still few professional and reputable piercing establishments in Vietnam. | <p>qualified workforce, with few professionals who have high-level expertise training.</p> <ul style="list-style-type: none"> - Piercing is an invasive procedure that can carry risks of infection if not performed properly. |
|--|---|

Table 4: Rebound Piercing SWOT (Source: Authors)

1.5.2. Products & Services

| Name | Description | Figure |
|----------------------|--|---|
| 1. Piercing Service | Provides safe and hygienic piercings using sterilized needles and quality materials like 925 Silver, Gold, and Titanium. Offers various types of piercings and ensure proper placement based on anatomy. |  |
| 2. Aftercare service | Guide customers on proper healing, provide cleaning solutions, and offer follow-up checkups if needed. Rebound team is available to assist with any concerns during the healing process. |  |

Table 5: Rebound Piercing Service (Source: Authors)

1.5.2.2. Products Group

| Name | Describe | Figure |
|-------------------------|--|---|
| 1. Basic Piercing Group | Basic Piercing Group includes simple, everyday jewelry made from Titanium and 925 Silver, designed for comfort and durability. These pieces are ideal for initial piercings or those looking for |  |

| | | |
|--------------------------------|---|---|
| | minimal, lightweight options. | |
| 2. High Quality Piercing Group | Crafted from hypoallergenic materials like high-grade Titanium and Gold-plated Silver, this collection offers more intricate designs with better durability and skin-friendly properties, suitable for long-term wear. |  |
| 3. Premium Piercing Group | Featuring solid Gold and high-end 925 Silver designs, this group includes detailed craftsmanship and unique styles. These pieces are designed for those who want luxury, elegance, and superior quality in their piercings. |  |

Table 6: Rebound Piercing Product Group (Source: Authors)

1.5.3 Requirement

1.5.3.1. Theme Colors

Rebound Piercing's website will maintain a minimalist, premium, and elegant aesthetic with the following color scheme:

- Primary Color: #C5BB95 (Warm Beige) – Supports the primary color, providing warmth and elegance.
- Secondary Colors:
 - + #DFDA98 (Light Gold) – Adds a soft golden touch for a refined, high-end feel.
 - + #978C5C (Deep Gold) – Used for subtle highlights and luxury elements.
 - + #000000 (Black) – Ensures high-contrast readability and adds a bold, modern touch.
 - + #FFFFFF (White) – Provides clean spacing and enhances visual balance.

- + #EFEFEF (Soft Gray) – Used for subtle backgrounds and smooth transitions.
- + #D9D9D9 (Neutral Gray) – Complements the palette with a refined, neutral tone.

This combination ensures a clean, luxurious, and sophisticated experience, aligning with Rebound Piercing's brand identity.

1.5.3.2. Typography

Font Family: Montserrat: Modern, stylish, and easy to read.

1.5.3.3. Functions

This section outlines the functional requirements necessary for the successful development and implementation of the Rebound Piercing website. These requirements ensure an efficient shopping experience, seamless service booking, and optimized business operations.

- Priority:

| Value | Rating | Description |
|--------------|---------------|--|
| 1 | Critical | Essential for the project's success. The project cannot function without this requirement. |
| 2 | High | Important but can be postponed for a Minimum Viable Product (MVP). |
| 3 | Medium | Adds value but is not required for an MVP launch. |
| 4 | Low | Nice to have, but project success is not dependent on it. |
| 5 | Future | Out of scope for now but may be added in future versions. |

Table 7: Priority Description (Source: Authors)

- Requirements Categories (RC1):

| RC 1: ORDER MANAGEMENT FUNCTIONALITY | | |
|--------------------------------------|---|--------------|
| ID | Requirement | Priority |
| RC 1.1. Product Ordering | Customers can easily order piercing jewelry and accessories through a seamless website process with clear product details, images, and pricing. | 1 (Critical) |
| RC 1.2. Product Filtering | Flexible filters help refine searches by type, material, style, and more for an efficient shopping experience. | 3 (Medium) |
| RC 1.3. Product Search | A powerful search function delivers relevant results in real-time, saving time for specific product searches. | 1 (Critical) |
| RC 1.4. Product Customization | Options for customizing materials, styles, and engravings offer a personalized shopping experience. | 5 (Future) |
| RC 1.5. Order History & Cart | Customers can track purchases, view current orders, and manage shopping carts. | 1 (Critical) |
| RC 1.6. Order Cancellation | Customers can request cancellations or refunds for eligible orders. | 4 (Low) |

Table 8: RC 1: Order Management Functionality (Source: Authors)

- Requirements Categories (RC2):

| RC 2: PAYMENT MANAGEMENT FUNCTIONALITY | | |
|--|--|--------------|
| ID | Requirement | Priority |
| RC 2.1. Payment Processing | Multiple secure payment methods, including cards, bank transfers, and e-wallets, ensure easy checkout. | 1 (Critical) |

| | | |
|--------------------------------------|---|---------|
| RC 2.1. Order Cancellation & Refunds | Customers can request cancellations or refunds for eligible orders. | 4 (Low) |
|--------------------------------------|---|---------|

Table 9: RC 2: Payment Management Functionality (Source: Authors)

- Requirements Categories (RC3):

| RC 3: SERVICE BOOKING FUNCTIONALITY | | |
|--|--|-----------------|
| ID | Requirement | Priority |
| RC 3.1. Service Booking | Customers must be able to book piercing services online. | 1 (Critical) |
| RC 3.2. Rescheduling & Cancellations | Allow customers to modify or cancel appointments via their accounts. | 4 (Low) |

Table 10: RC3: Service Booking Functionality (Source: Authors)

- Requirements Categories (RC4):

| RC 4: CUSTOMER ENGAGEMENT & SUPPORT FUNCTIONALITY | | |
|--|--|-----------------|
| ID | Requirement | Priority |
| RC 4.1. Blog Viewing | Provide a blog section featuring aftercare tips, trends, and updates. | 2 (High) |
| RC 4.2. Popup Registration | Implement live chat support for customer inquiries | 2 (High) |
| RC 4.3. FAQs Viewing | Allow customers to subscribe to newsletters and promotions. | 2 (High) |
| RC 4.4. Live Chat | Real-time chat support helps with inquiries during the shopping process. | 5 (Future) |

Table 11: Customer Engagement & Support Functionality (Source: Authors)

- Requirements Categories (RC5):

| RC 5: CUSTOMER PROFILE MANAGEMENT FUNCTIONALITY | | |
|---|--|--------------|
| ID | Requirement | Priority |
| RC 5.1. Login | Allows users to authenticate using their credentials (email/username and password) to access their personal profile. | 1 (Critical) |
| RC 5.2. Reset Password | Enables users to securely reset their password via email verification or security questions if they forget it. | 2 (High) |
| RC 5.3. Update Information | Users can modify personal details like name, contact information, and profile picture. | 2 (High) |
| RC 5.4. View Profile | Displays user information, including account details and preferences, in a structured format. | 2 (High) |

Table 12: Customer Profile Management Functionality (Source: Authors)

- Requirements Categories (RC6):

| RC 6: ADMIN PRODUCT MANAGEMENT FUNCTIONALITY | | |
|--|--|--------------|
| ID | Requirement | Priority |
| RC 6.1. Add Products | Admins can add new products with details such as name, price, category, and images. | 1 (Critical) |
| RC 6.2. Edit Products | Allows updating product information, including descriptions, prices, and availability. | 1 (Critical) |
| RC 6.3. Edit Stocks | Enables stock level adjustments to track inventory changes. | 1 (Critical) |

Table 13: Admin Product Management Functionality (Source: Authors)

- Requirements Categories (RC7):

| RC 7: ADMIN SERVICE MANAGEMENT FUNCTIONALITY | | |
|--|--|--------------|
| ID | Requirement | Priority |
| RC 7.1. View Reservations | Admins can check customer reservations for services. | 1 (Critical) |
| RC 7.2. Manage Reservations | Allows modifications, cancellations, or confirmations of bookings. | 1 (Critical) |

Table 14: Admin Service Management Functionality (Source: Authors)

- Requirements Categories (RC8):

| RC 8: ADMIN CUSTOMER MANAGEMENT FUNCTIONALITY | | |
|---|--|--------------|
| ID | Requirement | Priority |
| RC 8.1. Edit Customer | Admins can update customer details like contact information and preferences. | 1 (Critical) |

Table 15: Admin Customer Management Functionality (Source: Authors)

- Requirements Categories (RC9):

| RC 9: ADMIN SERVICE MANAGEMENT FUNCTIONALITY | | |
|--|--|--------------|
| ID | Requirement | Priority |
| RC 9.1. View Order | Displays a list of customer orders with details such as status and payment method. | 1 (Critical) |
| RC 9.2. Validate Order | Confirms order authenticity and updates order status accordingly. | 1 (Critical) |

Table 16: Admin Service Management Functionality (Source: Authors)

- Requirements Categories (RC10):

| RC 10: ADMIN PROFILE MANAGEMENT FUNCTIONALITY | | |
|---|-------------|----------|
| ID | Requirement | Priority |

| | | |
|-------------------------|---|--------------|
| RC 10.1. Login | Admin authentication to access the dashboard. | 1 (Critical) |
| RC 10.2. Reset Password | Allows admins to reset their password securely. | 1 (Critical) |

Table 17: Admin Profile Management Functionality(Source: Authors)

1.6 The goal of the project

- Short-term goals

- + Enhancing Brand Awareness: Rebound Piercing aims to build a strong image for premium piercing services in Ho Chi Minh City.
- + Building Trust Through Customer Feedback: By upholding high medical standards and using premium jewelry, Rebound Piercing is committed to quality. Actively collecting and responding to customer feedback will help refine the experience and strengthen trust.
- + Expanding Reach with Gen Z Focus: Targeted promotions, including discounts and engaging piercing events, will attract Gen Z, fostering a modern, trendy vibe that drives new customers and loyalty.

- Long-term goals

- + Expanding and Leading the Market: After success in Ho Chi Minh City, Rebound Piercing plans to open a second branch in Hanoi, aiming to lead Vietnam's premium piercing and jewelry market.
- + Diversifying Products for Aesthetic Appeal: Rebound will develop new designs to meet diverse customer preferences, retaining clients and attracting new ones.
- + Exceeding Competitors and Maximizing Satisfaction: Through top-notch quality and customer care, Rebound Piercing strives for high customer satisfaction, building loyalty across services and products.

1.7 Structure of project

Chapter 1: Project Overview

This chapter explains the reasons for choosing the topic, the scope and objectives of the project, the proposed functions for the website, and provides an overview of the brand, goals, and project structure.

Chapter 2: Theoretical Basis

This chapter covers the concepts, methods, and algorithms used in the project, including:

- Front-end: HTML, CSS, JavaScript, Angular, Bootstrap, FullCalendar
- Back-end: Node.js and Express
- Database: MySQL and MongoDB (NoSQL)

We also utilize tools such as Figma, Draw Io, GitHub, VS Code, to enhance the website's functionality.

Chapter 3: System Analysis and Design

This chapter introduces key functions for users and administrators, business process modeling, use case models, sequence diagrams, and database design.

Chapter 4: Website Interface

This chapter details the process of building the website for Rebound Piercing, including the sitemap, mockups, and the design of both user and admin interfaces.

Chapter 5: Conclusion

This chapter summarizes the results achieved through the project, discusses limitations, and outlines potential future developments.

CHAPTER 2: THEORETICAL BASIS

2.1 Front-end tools

2.1.1. Angular

Angular is a TypeScript-based front-end framework developed by Google, used for building single-page web applications. It provides a robust set of tools and features for developing dynamic, responsive web applications, including two-way data binding, dependency injection, and modular development.

The Rebound Piercing website leverages Angular to create a seamless single-page application experience, where users can browse products, book services, and interact with the platform without frequent page reloads. Angular's component-based architecture helps in organizing the application into reusable modules, enhancing maintainability and scalability.

2.1.2. Cascading Style Sheets (CSS)

CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation of a document written in HTML. It allows developers to control the layout, color schemes, fonts, and overall appearance of web pages, making it easier to maintain a consistent design across multiple pages. CSS enables responsive design, ensuring that web pages look good on various devices and screen sizes.

For the Rebound Piercing website, CSS is utilized to enhance the visual appeal of the web pages, creating an engaging and aesthetically pleasing user interface. The team applies CSS to style product categories, customize the layout of booking sections, and ensure a cohesive look and feel across the platform. This includes the use of CSS variables, class names, and responsive design techniques to provide a seamless experience on both desktop and mobile devices.

2.1.3. HyperText Markup Language (HTML)

HTML (HyperText Markup Language) is the standard markup language used for creating web pages and web applications. It defines the structure of web content using a set of elements and tags that describe the various parts of a web page, such as headings, paragraphs, images, links, and other multimedia elements. HTML is

essential for ensuring that web pages are properly structured and displayed across different devices and browsers, providing the foundation for web development.

In the development of the Rebound Piercing website, HTML is employed to structure the web pages, organizing the layout of product listings, booking forms, and user profiles. This ensures that the content is well-organized and easily accessible to users, forming the base for further enhancements using CSS and JavaScript.

2.1.4. JavaScript

JavaScript is a versatile programming language that adds interactivity and dynamic content to web pages. It allows for real-time updates, form validation, animations, and more, creating a richer user experience. JavaScript can interact with HTML and CSS to manipulate the DOM (Document Object Model), enabling dynamic changes to the web page content and layout.

In the Rebound Piercing website, JavaScript is employed to handle user interactions such as form submissions, booking confirmations, and real-time updates to product availability. It enhances the user experience by implementing dynamic features like interactive product galleries, search functionality, and client-side validation for booking forms. Additionally, JavaScript supports asynchronous data fetching, ensuring smooth and efficient communication between the front-end and back-end systems.

2.1.5. Bootstrap

Bootstrap is a popular front-end framework that facilitates responsive web design and simplifies the development of modern, mobile-first websites. It offers a comprehensive set of pre-designed components, such as navigation bars, buttons, and forms, along with a flexible grid system.

For the Rebound Piercing website, Bootstrap is employed to expedite the design process, ensuring a responsive and visually appealing layout. The framework's pre-styled components and utility classes are used to quickly build consistent and responsive elements across the website, enhancing the user experience on various devices.

2.2. Backend Tools

2.2.1. NodeJS

Node.js is a JavaScript runtime built on Chrome's V8 engine, designed for building fast and scalable server-side applications. It uses a non-blocking, event-driven architecture, making it highly efficient for handling multiple requests simultaneously. Node.js is widely used for building RESTful APIs and real-time applications.

On the Rebound Piercing platform, Node.js powers the back-end server, handling API requests, authentication, and business logic. It seamlessly integrates with MongoDB, ensuring smooth data retrieval and updates while maintaining high performance. This combination enables a responsive and efficient platform for both customers and administrators.

2.3. Structured Query Language - MongoDB

MongoDB is a NoSQL database known for its flexibility in handling unstructured or semi-structured data. It stores data in JSON-like documents, which makes it a great choice for applications with dynamic schemas. MongoDB is designed to scale horizontally, offering high availability and scalability.

MongoDB is used alongside MySQL to handle data that does not fit into a strict relational schema, such as user activity logs and dynamic product attributes. This dual-database approach allows the Rebound Piercing platform to manage various types of data efficiently, providing flexibility in data modeling and retrieval.

2.4. Supporting Tools

2.4.1. Figma

Figma is a cloud-based design tool used for UI/UX design. It allows for real-time collaboration, making it easier for teams to work together on design projects. Figma supports vector graphics editing and prototyping, which helps in creating interactive and visually appealing designs.

Figma is utilized to design the user interface of the Rebound Piercing website. The team uses it to create wireframes, mockups, and interactive prototypes, ensuring that the final design aligns with user expectations and provides a seamless experience.

2.4.2. Drawio

Draw.io is a free, web-based diagramming tool used for creating flowcharts, UML diagrams, network diagrams, and more. It offers a wide range of templates and shapes, making it easy to visualize and document processes.

The team uses Draw.io to create system architecture diagrams, data flow diagrams (DFDs), business process modelling notation (BPMN), use cases and process workflows for the Rebound Piercing platform. These visualizations help in understanding and communicating the system's structure and operations, facilitating better planning and implementation.

2.4.3. Github

GitHub is a web-based platform for version control and collaboration. It allows developers to work on projects together, track changes, and manage code repositories using Git. GitHub also supports issue tracking, project management, and continuous integration/continuous deployment (CI/CD) workflows.

The Rebound Piercing development team uses GitHub to manage our codebase, collaborate on features, and track issues. GitHub's version control system ensures that changes are documented, conflicts are minimized, and the project maintains a stable and deployable state.

2.4.4. Visual Studio Code (VS Code)

Visual Studio Code is a popular source-code editor developed by Microsoft. It supports multiple programming languages and provides features like syntax highlighting, code completion, debugging, and Git integration. VS Code is known for its extensibility, allowing developers to enhance its functionality through various extensions.

The development team uses Visual Studio Code as the primary code editor for the Rebound Piercing project. Its robust features and extensions for JavaScript, Node.js, and Angular development streamline the coding process, improve productivity, and facilitate seamless integration with version control systems like Git.

CHAPTER 3: SYSTEM ANALYSIS & DEVELOPMENT

3.1. Use cases

3.1.1. Use cases for customers

3.1.1.1. List of Use Case

- Log in
- Forgot Password
- Sign up
- Sign out
- Select Products
- Add and view products
- View blog
- Make payment
- Manage Account (View Profile and Update Profile)
- View order history
- Add and view cart
- Reserve services
- View services
- Contact Rebound for support
- Validate Service Reservation
- Fulfill customer's needs
- Manage Orders
- Manage Products
- Manage Inventory

- Process Payment

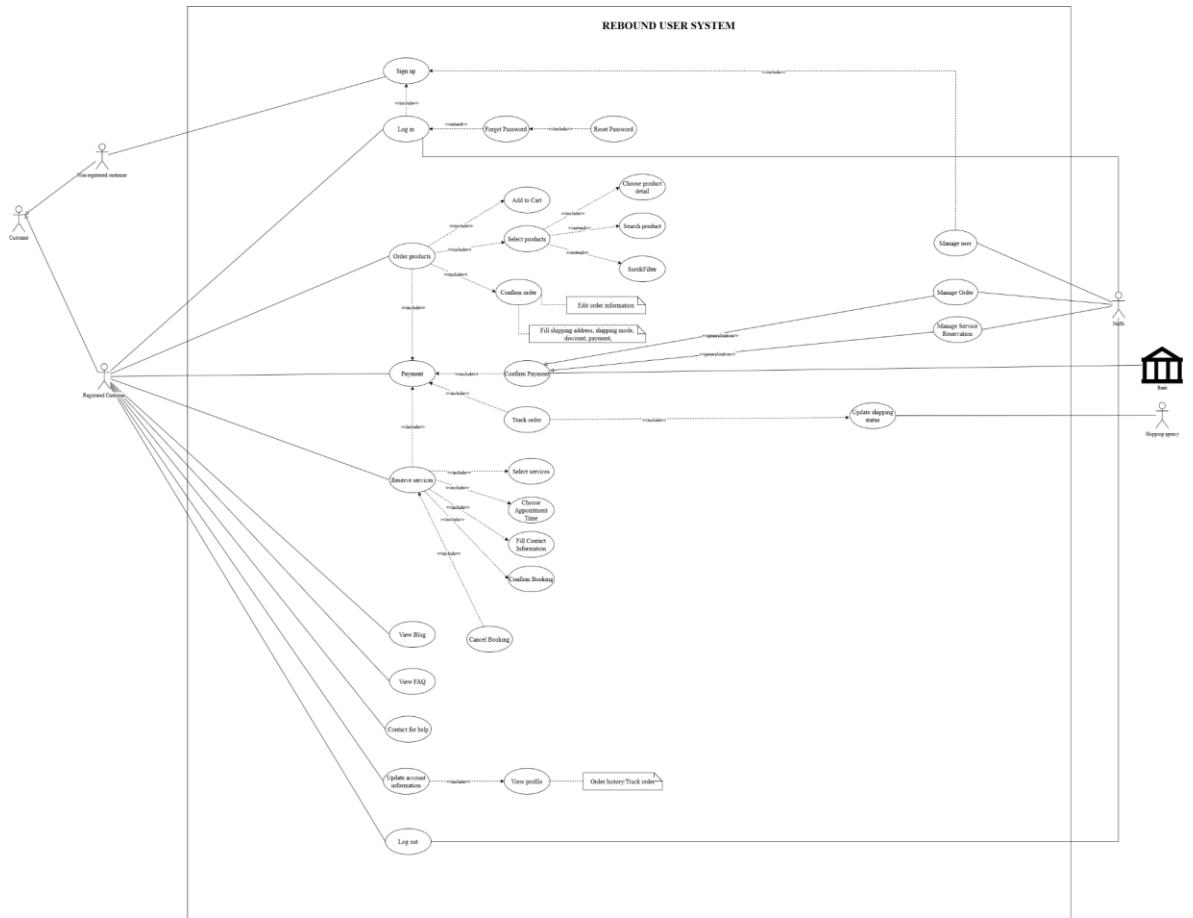


Figure 5: Use Case For Users (Source: Authors)

3.1.1.2. User Use Case Specification

UseCase: Sign-up

| | |
|------------------------------|---|
| Name | Sign-up |
| Actor | Non-registered Customer |
| Description | The process of creating a new account on the system. |
| Successful Completion | <ol style="list-style-type: none"> 1. User accesses the sign-up page. 2. Enters required information (name, email, password, phone number, etc.). |

| | |
|-------------------------|---|
| | <p>3. The system validates the input.</p> <p>4. The system sends a confirmation email.</p> <p>5. The user verifies the email, and the account is activated.</p> |
| Alternative Flow | <ul style="list-style-type: none"> - If the email already exists, the system shows an error. - If input is invalid, the system requests a correction. |
| Pre-condition | The user does not have an account. |
| Post-condition | The user successfully registers and can log in. |
| Assumption | The email system is functioning properly. |

Table 18: UC Sign-up (Source: Authors)

UseCase: Log-in

| | |
|------------------------------|---|
| Name | Log-in |
| Actor | Registered Customer |
| Description | The process of logging into the system. |
| Successful Completion | <ol style="list-style-type: none"> 1. User accesses the login page. 2. Enter email/phone number and password. 3. The system verifies credentials. 4. If correct, the user is logged in. |
| Alternative Flow | <ul style="list-style-type: none"> - If the password is incorrect, the system shows an error. - If the user forgets the password, they can select Forgot Password. |
| Pre-condition | The user has a registered account. |

| | |
|-----------------------|---|
| Post-condition | The user successfully logs into the system. |
| Assumption | Authentication service is working properly. |

Table 19: UC Log-in (Source: Authors)

Usecase: Forgot Password

| | |
|------------------------------|---|
| Name | Forgot Password |
| Actor | User |
| Description | The process of recovering a forgotten password. |
| Successful Completion | 1. User selects Forgot Password on the login page. 2. Enters the registered email. 3. The system sends a reset link via email. 4. The user clicks the link and sets a new password. 5. Password is successfully updated. |
| Alternative Flow | - If the email does not exist, the system displays an error. |
| Pre-condition | The user has a registered account. |
| Post-condition | The user resets the password and can log in. |
| Assumption | The email system is functional. |

Table 20: UC Forgot Password (Source: Authors)

Usecase: Order Products

| | |
|-------------|----------------|
| Name | Order Products |
|-------------|----------------|

| | |
|------------------------------|--|
| Actor | Registered Customer |
| Description | The process of ordering products on the platform. |
| Successful Completion | <ol style="list-style-type: none"> 1. The user searches for and selects products. 2. Adds products to the cart. 3. Reviews the cart and enters shipping details. 4. Chooses a payment method. 5. The system creates an order and proceeds to payment. |
| Alternative Flow | <ul style="list-style-type: none"> - If the product is out of stock, the system notifies the user. - If the cart is empty, the system prompts the user to add products. |
| Pre-condition | The user is logged in. |
| Post-condition | The order is successfully created. |
| Assumption | The system has available products. |

Table 21: UC Order Products (Source: Authors)

UseCase: Payment

| | |
|------------------------------|--|
| Name | Payment |
| Actor | Registered Customer |
| Description | The process of making a payment for an order. |
| Successful Completion | <ol style="list-style-type: none"> 1. The user selects a payment method. 2. Enters payment details. 3. The system verifies the payment. |

| | |
|-------------------------|--|
| | 4. If successful, the order is confirmed. |
| Alternative Flow | If payment fails, the system notifies the user and allows retry. |
| Pre-condition | The user has placed an order. |
| Post-condition | The payment is processed successfully. |
| Assumption | The payment gateway is functioning correctly. |

Table 22: UC Payment (Source: Authors)

Usecase: Confirm Payment

| | |
|------------------------------|--|
| Name | Confirm Payment |
| Actor | Bank |
| Description | The bank confirms the payment transaction. |
| Successful Completion | <ol style="list-style-type: none"> 1. The system sends a payment request to the bank. 2. The bank verifies and confirms the transaction. 3. The system receives the confirmation. |
| Alternative Flow | - If the transaction fails, the system notifies the user. |
| Pre-condition | The user has entered payment details. |
| Post-condition | Payment is either confirmed or rejected. |
| Assumption | The banking system is operational. |

Table 23: UC Confirm Payment (Source: Authors)

Usecase: Track Order

| | |
|------------------------------|---|
| Name | Track Order |
| Actor | Registered Customer |
| Description | The process of tracking an order's status. |
| Successful Completion | <ol style="list-style-type: none"> 1. The user accesses Track Order. 2. Enters the order ID or views the order list. 3. The system displays the order status. |
| Alternative Flow | - If the order ID is invalid, the system shows an error. |
| Pre-condition | The user has placed an order. |
| Post-condition | The user sees the order status. |
| Assumption | The system updates order statuses correctly. |

Table 24: UC Track Order (Source: Authors)

Usecase: Update Shipping Status

| | |
|------------------------------|--|
| Name | Update Shipping Status |
| Actor | Shipping Agency |
| Description | The shipping agency updates the order status. |
| Successful Completion | <ol style="list-style-type: none"> 1. The shipping agency updates the delivery status. 2. The system records the update and notifies the customer. |

| | |
|-------------------------|--|
| Alternative Flow | - If the system fails, the update is unsuccessful. |
| Pre-condition | The order is in transit. |
| Post-condition | The order status is updated. |
| Assumption | The system synchronizes shipping data correctly. |

Table 25: UC Update Shipping Status (Source: Authors)

UseCase: Reserve Services

| | |
|------------------------------|---|
| Name | Reserve Services |
| Actor | Registered Customer |
| Description | The process of booking a service appointment. |
| Successful Completion | <ol style="list-style-type: none"> 1. The user selects a service. 2. Chooses a time slot. 3. Enters contact details. 4. Confirms the booking. |
| Alternative Flow | - If the selected time is unavailable, the system suggests alternatives. |
| Pre-condition | The user is logged in. |
| Post-condition | The appointment is booked successfully. |
| Assumption | The system correctly displays available slots. |

Table 26: Reserve Services (Source: Authors)

3.1.2. Use Cases For Administration

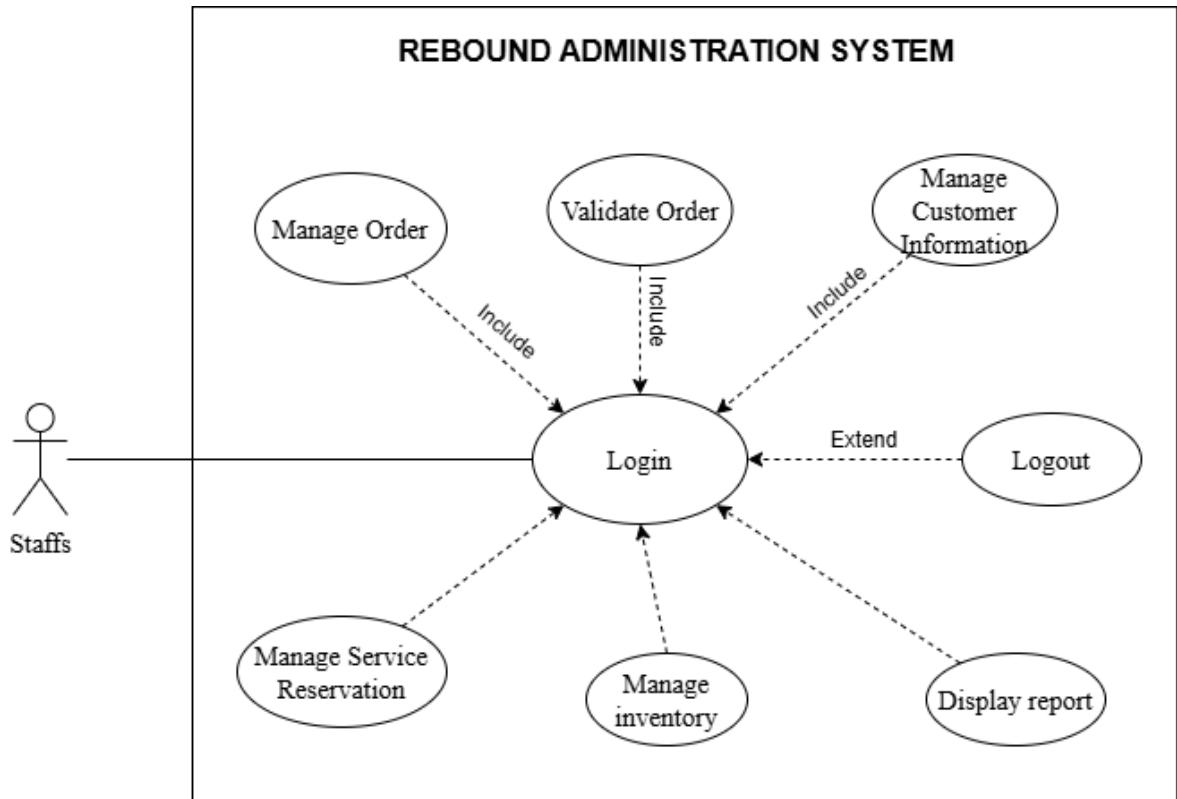


Figure 6: Use Case For Administration (Source: Authors)

3.1.2.1. Admin User Case Specification

Usecase: Login

| | |
|------------------------------|---|
| Name | Login |
| Actor | Staffs |
| Description | The staff logs into the system using their credentials to access various functionalities. |
| Successful Completion | The staff enters valid credentials, the system authenticates them, and they are redirected to the dashboard. |
| Alternative Flow | 1. If the credentials are incorrect, an error message is displayed, and the staff is prompted to re-enter them. |

| | |
|-----------------------|---|
| | 2. If the staff forgets their password, they can reset it via email verification. |
| Pre-condition | The staff must have a registered account in the system. |
| Post-condition | The staff is successfully logged in and can access system features. |
| Assumption | The system is online and operational. |

Table 27: UC Login Admin (Source: Authors)

UseCase: Logout

| | |
|------------------------------|---|
| Name | Logout |
| Actor | Staffs |
| Description | The staff logs out of the system, ending their session. |
| Successful Completion | The staff clicks the logout button, and the system logs them out, redirecting them to the login page. |
| Alternative Flow | If there is a session timeout, the system automatically logs out the staff. |
| Pre-condition | The staff must be logged into the system. |
| Post-condition | The staff is logged out, and their session is terminated. |
| Assumption | The staff logs out manually or due to session expiration. |

Table 28: UC Logout Admin (Source: Authors)

UseCase: Validate Order

| | |
|------------------------------|---|
| Name | Validate Order |
| Actor | Staffs |
| Description | The staff verifies order details before confirming them for processing. |
| Successful Completion | The staff reviews order details and confirms their validity. The order status is updated. |
| Alternative Flow | If the order is invalid, the staff can reject or request modifications. |
| Pre-condition | The staff must be logged in and have the necessary permissions to validate orders. |
| Post-condition | The order is either confirmed or marked for correction. |
| Assumption | Orders have been placed and are awaiting validation. |

Table 29: Validate Order Admin (Source: Authors)

UseCase: Manage Order

| | |
|------------------------------|--|
| Name | Manage Order |
| Actor | Staffs |
| Description | The staff can create, update, or cancel orders in the system. |
| Successful Completion | The order is successfully created, updated, or canceled, and the system records the changes. |

| | |
|-------------------------|---|
| Alternative Flow | If the order details are incomplete, the system prompts the staff to enter missing information. |
| Pre-condition | The staff must be logged in and have order management permissions. |
| Post-condition | The order data is updated in the system. |
| Assumption | The staff is authorized to manage orders. |

Table 30: UC Manage Order Admin (Source: Authors)

Usecase: Manage Customer Information

| | |
|------------------------------|---|
| Name | Manage Customer Information |
| Actor | Staffs |
| Description | The staff can view, edit, and update customer information. |
| Successful Completion | The customer information is successfully updated in the system. |
| Alternative Flow | If the customer record does not exist, the staff can create a new record. |
| Pre-condition | The staff must be logged in and have access to customer records. |
| Post-condition | Customer details are updated in the system. |
| Assumption | The system stores and retrieves customer information correctly. |

Table 31: UC Manage Customer Information Admin (Source: Authors)

Usecase: Manage Service Reservation

| | |
|------------------------------|--|
| Name | Manage Service Reservation |
| Actor | Staffs |
| Description | The staff can schedule, update, or cancel service reservations. |
| Successful Completion | A service reservation is successfully created, modified, or canceled. |
| Alternative Flow | If the requested time slot is unavailable, the staff must choose another time. |
| Pre-condition | The staff must be logged in and have access to reservation management. |
| Post-condition | The reservation schedule is updated in the system. |
| Assumption | Customers have made service requests in advance. |

Table 32: UC Manage Service Reservation Admin (Source: Authors)

UseCase: Manage Inventory

| | |
|------------------------------|--|
| Name | Manage Inventory |
| Actor | Staffs |
| Description | The staff can add, remove, and update inventory items. |
| Successful Completion | Inventory records are updated successfully. |
| Alternative Flow | If an item is out of stock, the system alerts the staff. |

| | |
|-----------------------|--|
| Pre-condition | The staff must be logged in and have inventory management permissions. |
| Post-condition | Inventory data is correctly updated in the system. |
| Assumption | The inventory is regularly monitored and updated. |

Table 33: UC Manage Inventory Admin(Source: Authors)

Usecase: Display Report

| | |
|------------------------------|---|
| Name | Display Report |
| Actor | Staffs |
| Description | The staff can generate and view various system reports. |
| Successful Completion | A report is successfully generated and displayed. |
| Alternative Flow | If no data is available, the system notifies the staff. |
| Pre-condition | The staff must be logged in and have reporting permissions. |
| Post-condition | The report is displayed and can be exported if needed. |
| Assumption | The system has stored sufficient data for reporting. |

Table 34: UC Display Report Admin(Source: Authors)

3.2. Business Process Modelling

3.2.1. General BPMN

The BPMN diagram provides a clear and structured overview of the user journey on the online platform, detailing the steps based on whether the user logs in or proceeds as a guest. The process begins at the Main Menu, where users can choose to Sign In or continue as a Guest.

- Guest Users: If the user chooses to proceed as a guest, they can only View Products, View Services, and View Blog. Guest users are not allowed to perform actions like Add to Cart or Reserve Service, which require signing in.
- Login/Signup Process: If the user opts to log in, the system checks if they already have an account:
 - + If the user has an account, they enter their Credentials, and upon Sign In Success, they can access additional features such as View+Reserve Service, View Products+Add to Cart, Cart&Order and FAQs.
 - + If the user doesn't have an account, they can Sign Up, providing the necessary details to create a new account, and then proceed to log in after account creation.
 - + For users who have forgotten their credentials, there is an option to reset their password by entering their email address.
- Post-Signin Features: Once signed in, users can perform various actions like Change Personal Information and Password, Place Order, Order Payment, Immediate Order Tracking, and View Order History. Additionally, they can Cancel Order if needed.
- Logout Option: At any time during their session, users can choose to Log Out, ending their session. Alternatively, they can remain logged in for future interactions.

This flow highlights the platform's tiered user experience, providing guests with limited access to content viewing, while registered users enjoy full transactional and account management capabilities, ensuring a smooth, personalized experience based on the user's engagement level.

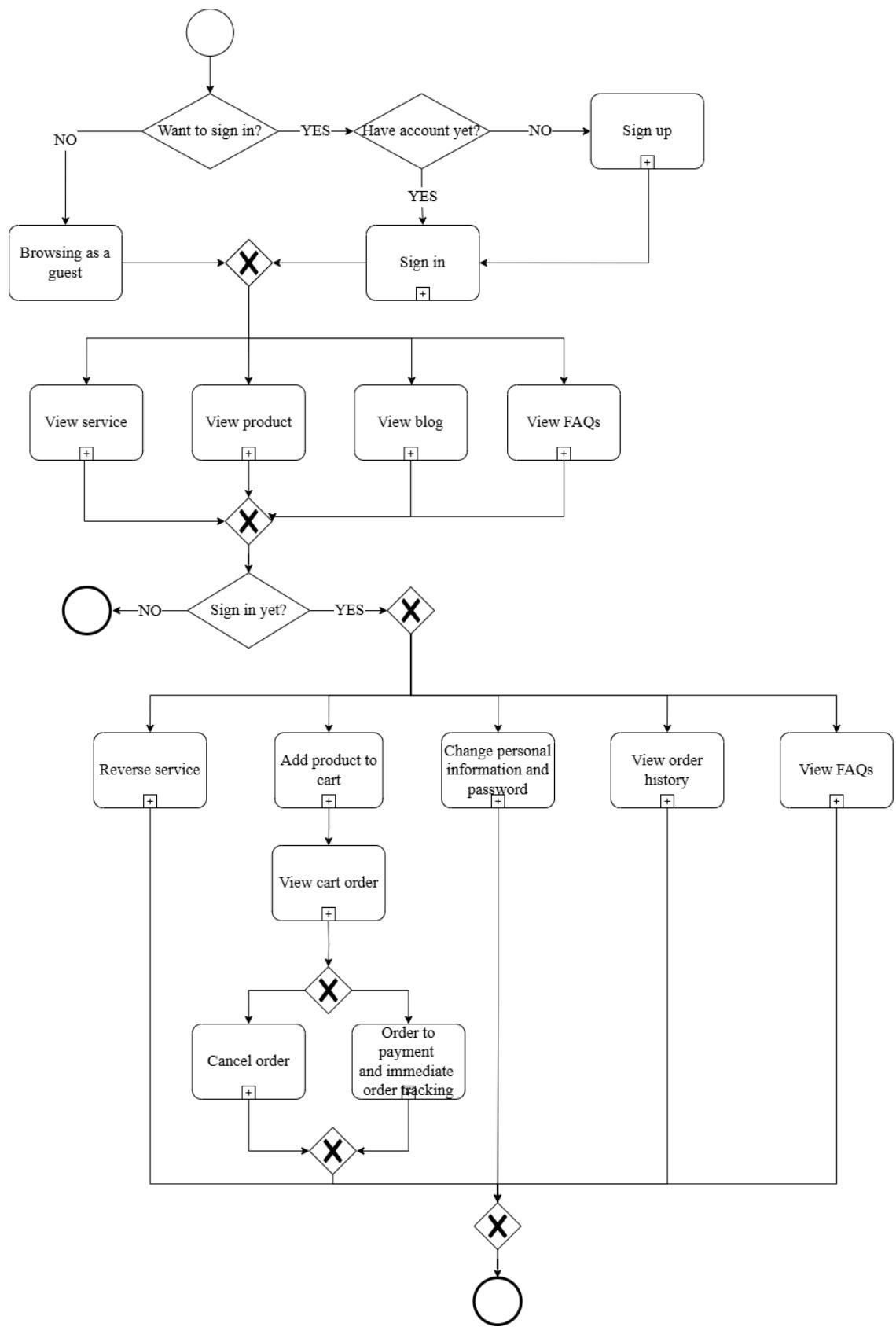


Figure 7: General BPMN (Source: Authors)

3.2.2. Log in/Sign up

- Sign In: When customers select "Sign In", they will enter their email into the system. The system will check the email: if the format is incorrect, customers will be asked to re-enter it or choose "Create a new account". If the email is valid but not registered, they can also choose "Create a new account". Once the email is valid, customers proceed to enter their password. The system will compare the password with the database. If the password is correct, customers will receive a "Successful Sign In" notification and be redirected to the Home Page. If the password is incorrect, the system will display an error message and ask customers to choose between "Re-enter Password" or "Forgot Password". If they select "Forgot Password", they will be guided through the password recovery process before signing in again.
- Sign Up: When customers select "Sign Up", they will enter all the required information. The system will validate the data: if it is correct, the information will be saved in the database, and customers will be redirected to the Home Page without needing to sign in again. If there are errors, the system will display a message indicating which fields need to be corrected.

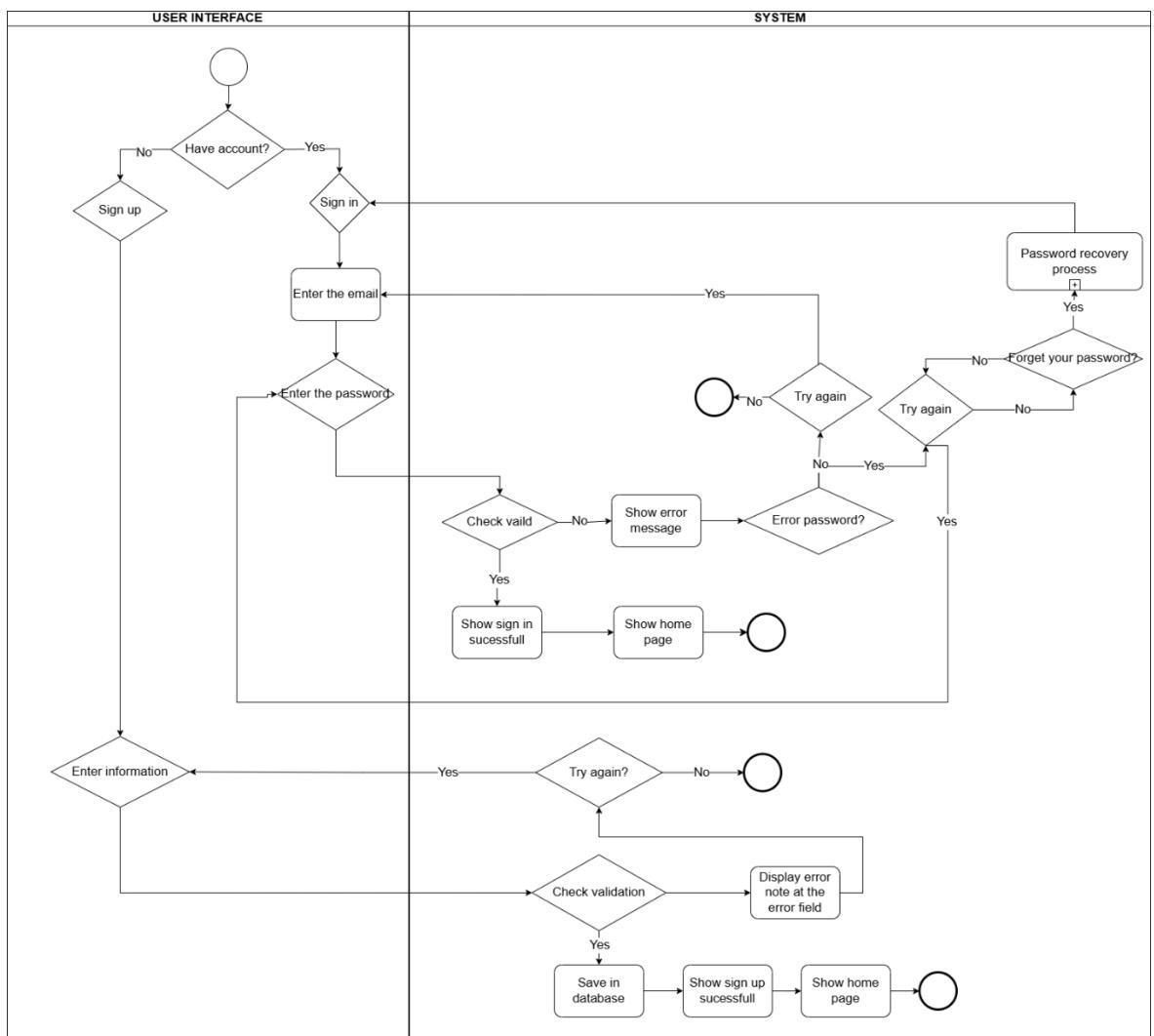


Figure 8: BPMN For Login/Sign up (Source: Authors)

3.2.3. Forgot Password

After selecting "Forgot password", the system will redirect the customer to the password recovery page and ask them to enter their email or phone number (SMS). Once the customer enters their email/SMS, the system will send a verification code via email or SMS.

If the customer has received the code, they must enter it for the system to verify before setting a new password. If the customer has not received the verification code, they can request a resend every 2 minutes. The verification code is valid for 3 minutes from the time it is sent.

The system will check whether the new password meets the required criteria (at least 8 characters). If the password is valid, the customer will be asked to re-enter it for confirmation. If the password does not meet the requirements, the system will ask whether the customer wants to re-enter a new password. If the customer chooses to re-enter, they can input a new password; if not, the password recovery process will end.

If the two passwords match, the system will save the new password to the database and display a "Password changed successfully" notification. If the passwords do not match, the system will show an error message and ask whether the customer wants to try again. If the customer chooses to try again, they can re-enter the password; if not, a confirmation message will appear to end the process. If the customer clicks "Confirm", the process will end. If the customer clicks "No", they can continue and re-enter their password.

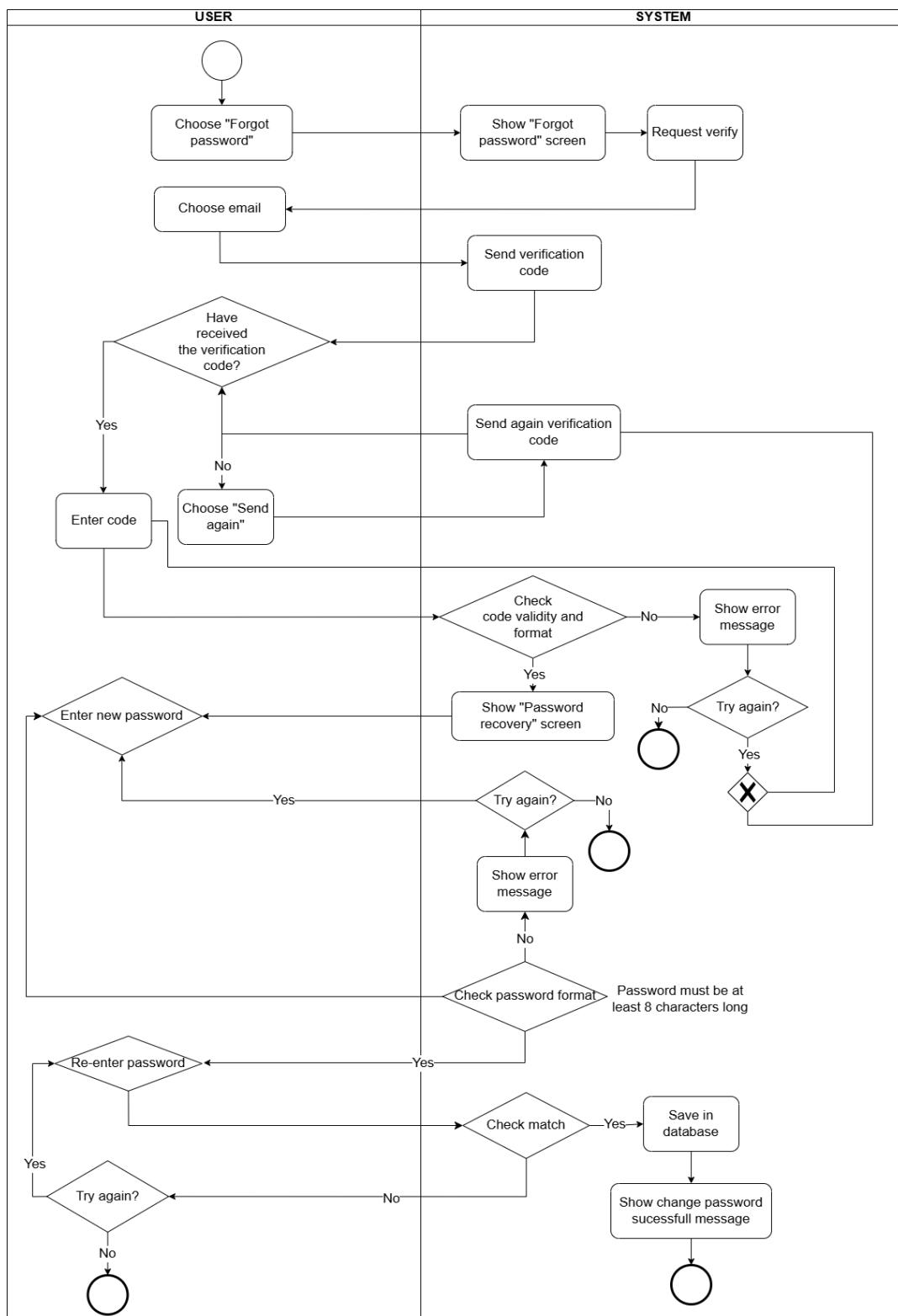


Figure 9: BPMN For Forgot Password (Source: Authors)

3.2.4. Change personal information and password

After logging in or registering, customers can select "Profile" to view their information. If they want to make changes, they need to click on the "Change information" button:

- Change password: The system will display the password change screen. The customer needs to enter their current password for the system to verify. If the current password is correct, the system will allow the customer to enter a new password. If the current password is incorrect, the customer can re-enter it, but they are only allowed to make a maximum of 5 attempts. After entering the new password, the system will check if it meets the correct format. If the format is correct, the customer will be asked to re-enter the new password. If the new password does not meet the required format, the customer can either re-enter the password or end the process. After re-entering the password, the system will check if the two passwords match. If they match, a message will be displayed confirming the password change. If they do not match, the customer can try entering the password again or end the process. The system will display a confirmation message, and the customer will need to click "Confirm" to complete the process.
- Change personal information: The customer will re-enter their personal information and then click "Update." The system will display a message confirming the successful update, and the information will be updated in the database.

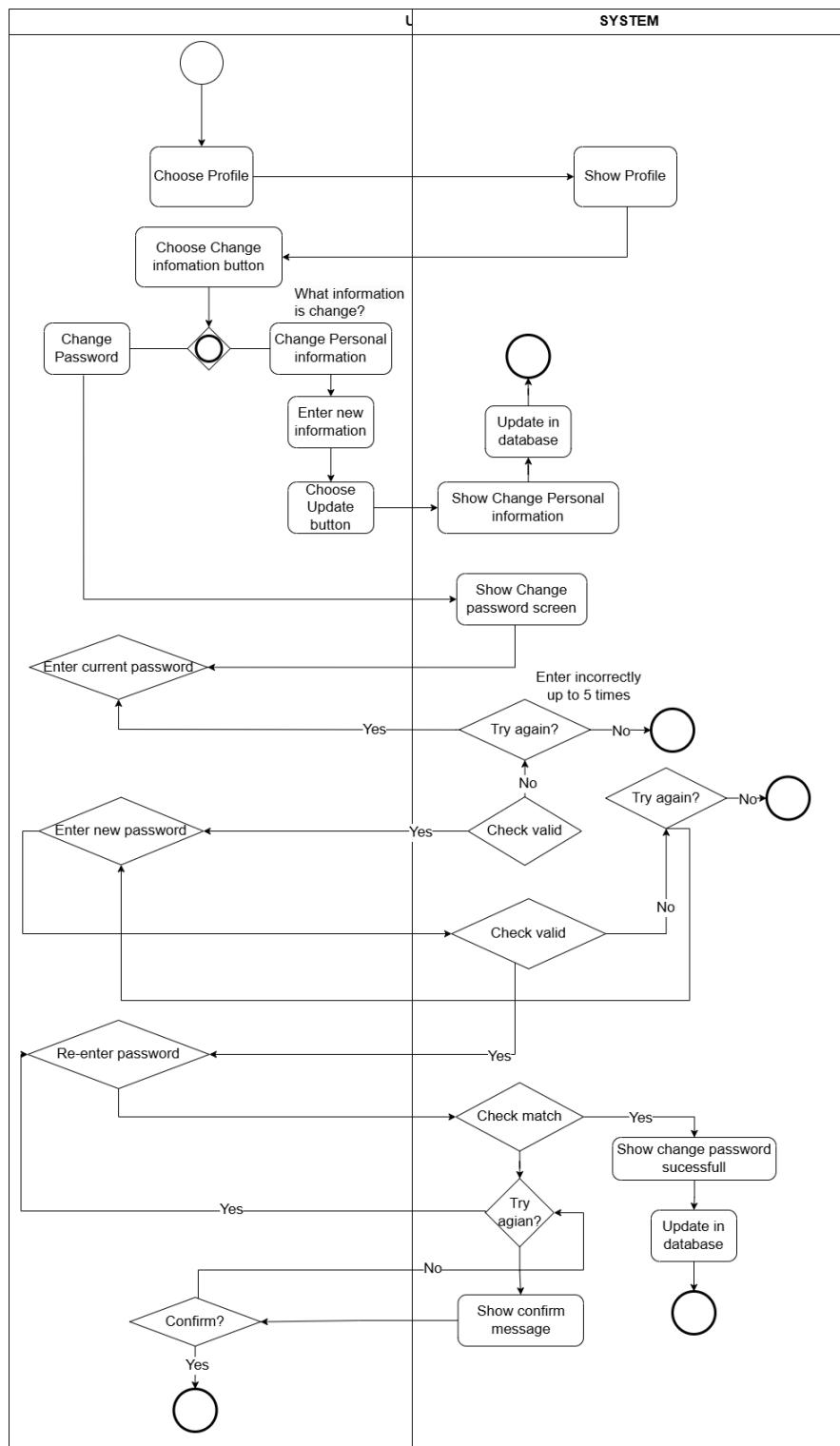


Figure 10: BPMN For Change Personal Information And Password (Source: Authors)

3.2.5. View And Reserve Service

The process of booking and managing appointments begins with the user selecting the desired service, followed by the option to book an appointment. As part

of this initial stage, the user specifies the type of jewelry related to the service and chooses an appropriate date and time for the appointment.

Once these choices are made, the system prompts the user to input personal information. It ensures that all required fields are filled and that the provided information is accurate. If errors are detected such as missing fields or incorrect data, the system provides immediate feedback through error messages, prompting the user to make corrections. For users who are not logged in, the process redirects them to a login page. The system checks the login credentials, and only upon successful authentication can the user proceed. In the event of repeated login failures, the user is given opportunities to retry until success is achieved.

After the user completes these steps and the information is validated, the system sends a validation email to confirm the reservation. The user is then navigated to a success page, where they have the flexibility to view their reservations or make additional bookings.

Users can view their appointments and make adjustments, such as rescheduling or canceling. For cancellations, the process includes an extra layer of validation: users must provide a reason in an input box. If no reason is entered, the system halts the cancellation and notifies the user. However, when a reason is provided, the system saves the input, processes the cancellation, and deletes the reservation. A confirmation message is displayed to ensure the user is aware of the successful cancellation.

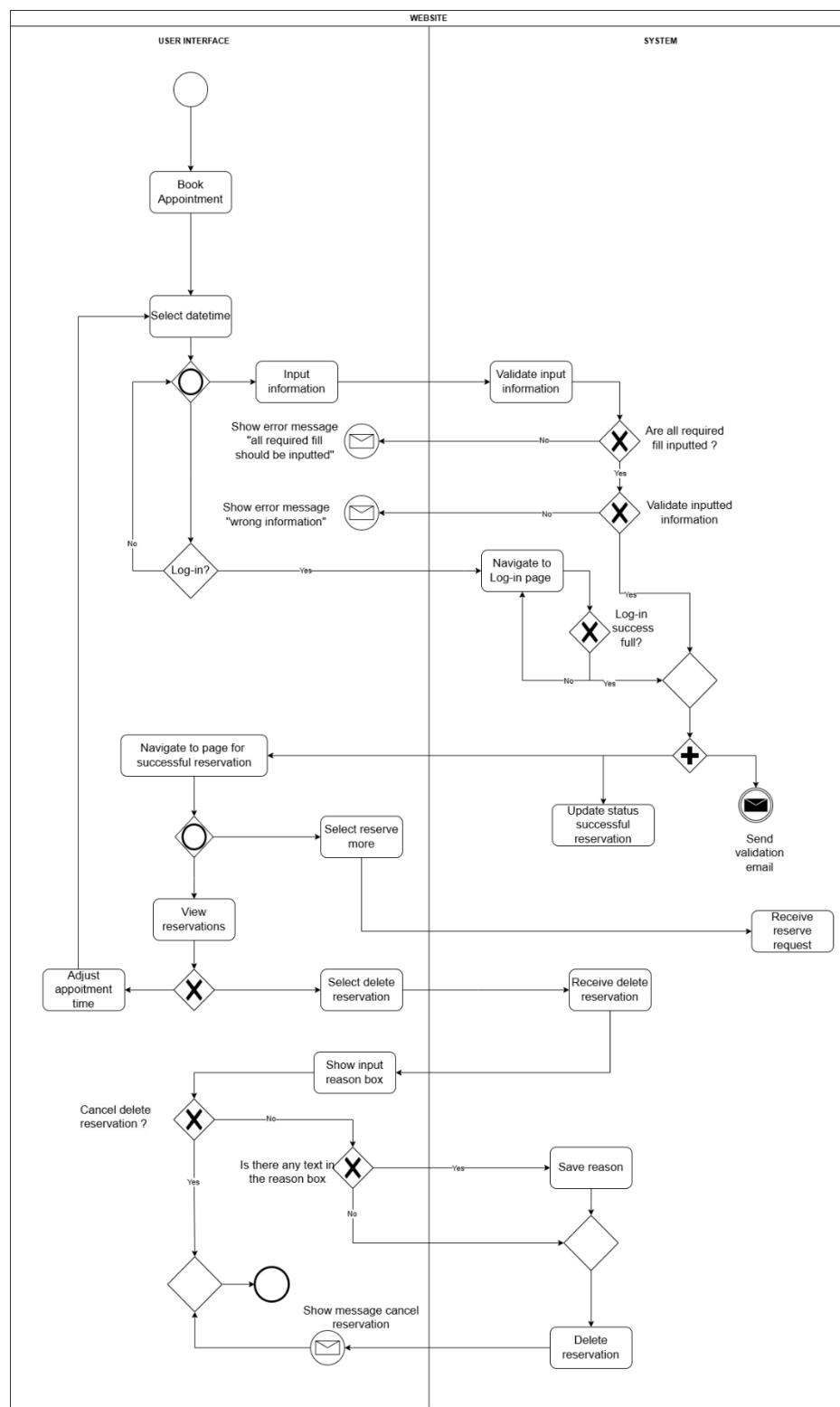


Figure 11: BPMN For View And Reserve Service (Source: Authors)

3.2.6. View Product And Add To Cart

Users can input relevant product information, such as the product name or filter criteria, to refine the search. Once the search query is submitted, the system processes the input and attempts to locate the desired products. If no matching products are found, the system displays a message indicating that the search yielded no results, prompting the user to adjust their query. Conversely, if products are found, a list of relevant items is presented to the user for selection.

Upon selecting a product from the list, the user is provided with options to customize their choice by selecting attributes such as size or material. Once satisfied, the user can proceed to add the product to their cart. The system then updates the cart to reflect the newly added items and displays the updated cart on the product screen for review.

Users can view the contents of their cart and opt to delete specific items if necessary. If a deletion is initiated, the system checks whether the quantity of the item is reduced to zero. If so, the item is entirely removed from the cart. Otherwise, the quantity is updated to reflect the adjustment.

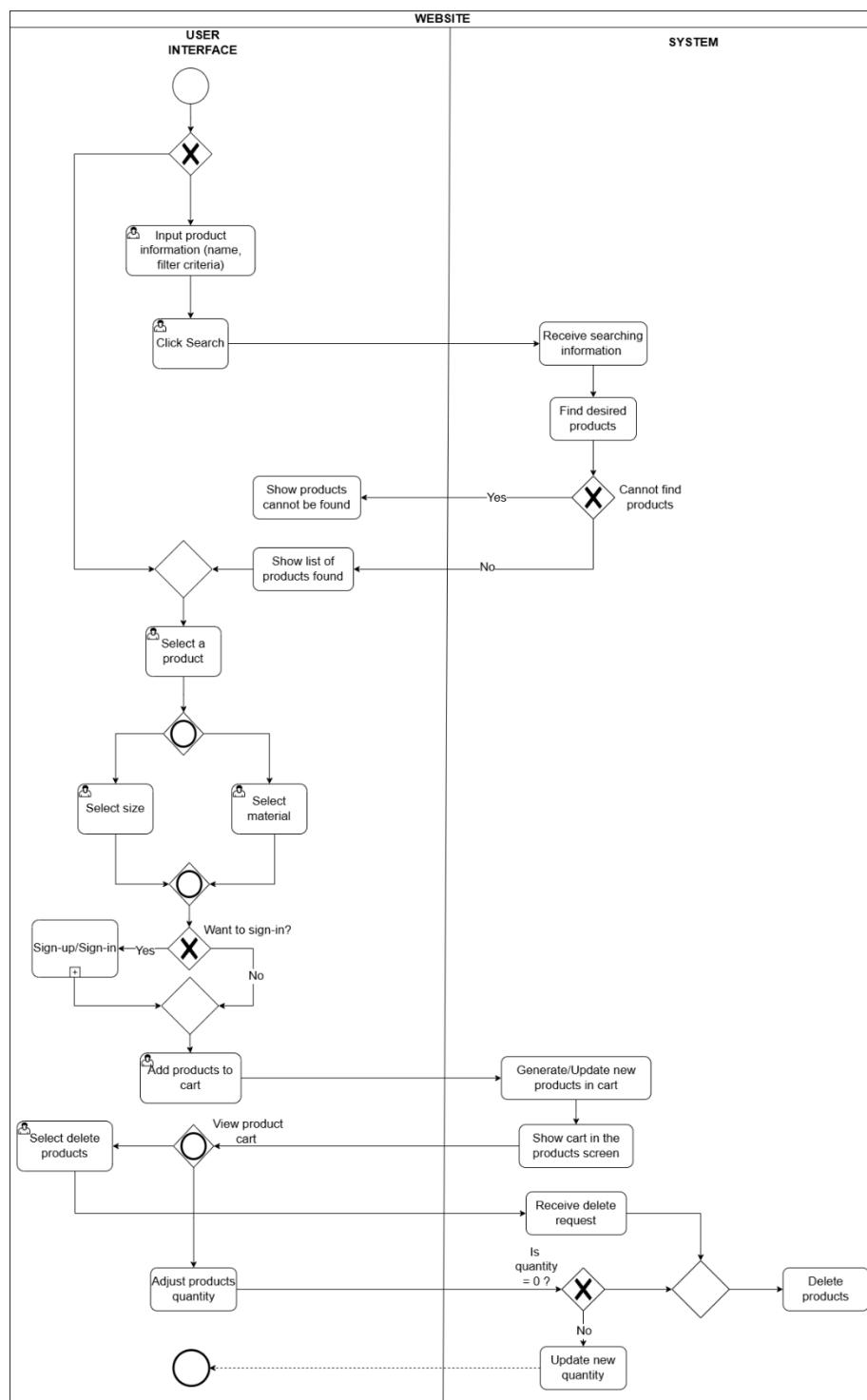


Figure 12: BPMN For View Product And Add To Cart (Source: Authors)

3.2.7. Cart And Order

When adding new products, the user can search for items by inputting relevant product information such as name or filter criteria. The system processes the input and searches for matching products. If no results are found, the system displays a message indicating that the desired products cannot be located. The user can then refine their search or choose to view similar products. If matching products are found, the system presents a list for the user to browse and select from. Once the desired product is chosen, the user adds it to the cart, and the system updates the cart accordingly, reflecting the newly added items.

Cart management allows users to further adjust their selections. They can view the contents of the cart and choose to either delete specific items or adjust their quantities. If a product is marked for deletion, the system verifies whether the quantity has been reduced to zero. If so, the product is removed entirely from the cart. Adjusting the quantity of an item prompts the system to update the cart, ensuring the changes are accurately reflected.

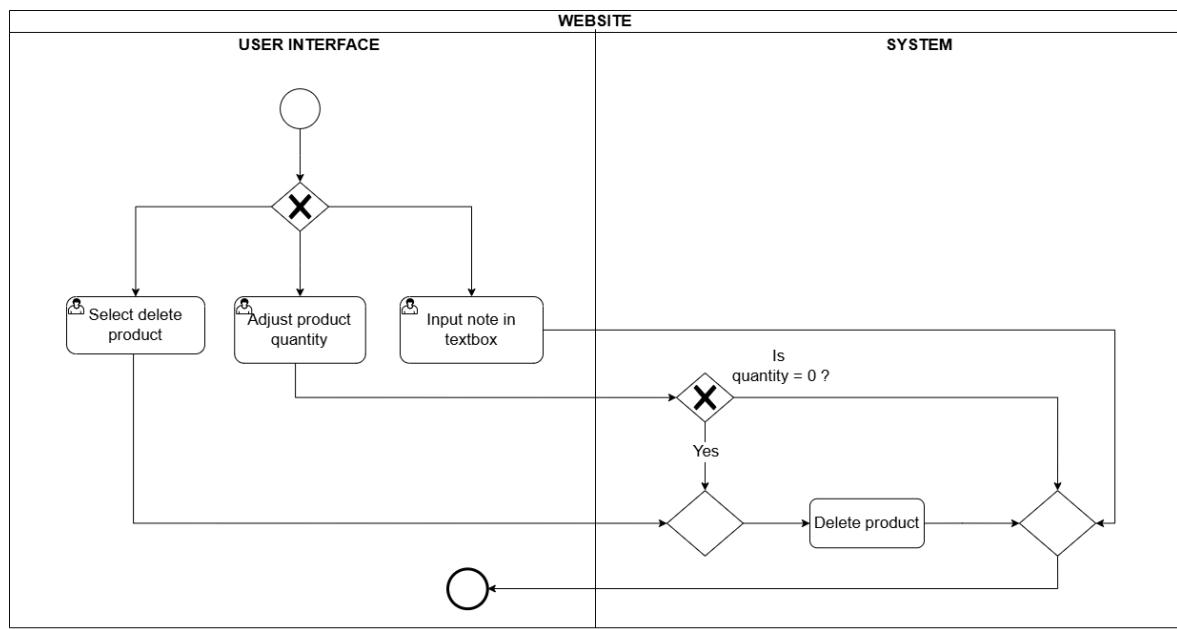


Figure 13: BPMN For Cart And Order (Source: Authors)

3.2.8. Order To Payment And Immediate Order Tracking

Modify the cart contents. If any modifications are made, the system updates the cart list to reflect the changes. After finalizing the cart, the user selects "Proceed to Purchase." At this stage, users are given the option to apply available vouchers. The system facilitates this by displaying eligible voucher options, adding value through discounts or benefits.

The payment process diverges into two main pathways based on the selected method: Cash on Delivery (COD) or Online Transaction.

- COD: The process is straightforward, requiring no further validation, and moves directly to transaction saving and optional tracking.
- Online Transactions: Users can choose between various transaction types, such as digital wallets or direct bank payments. The system validates the payment with the chosen financial institution.

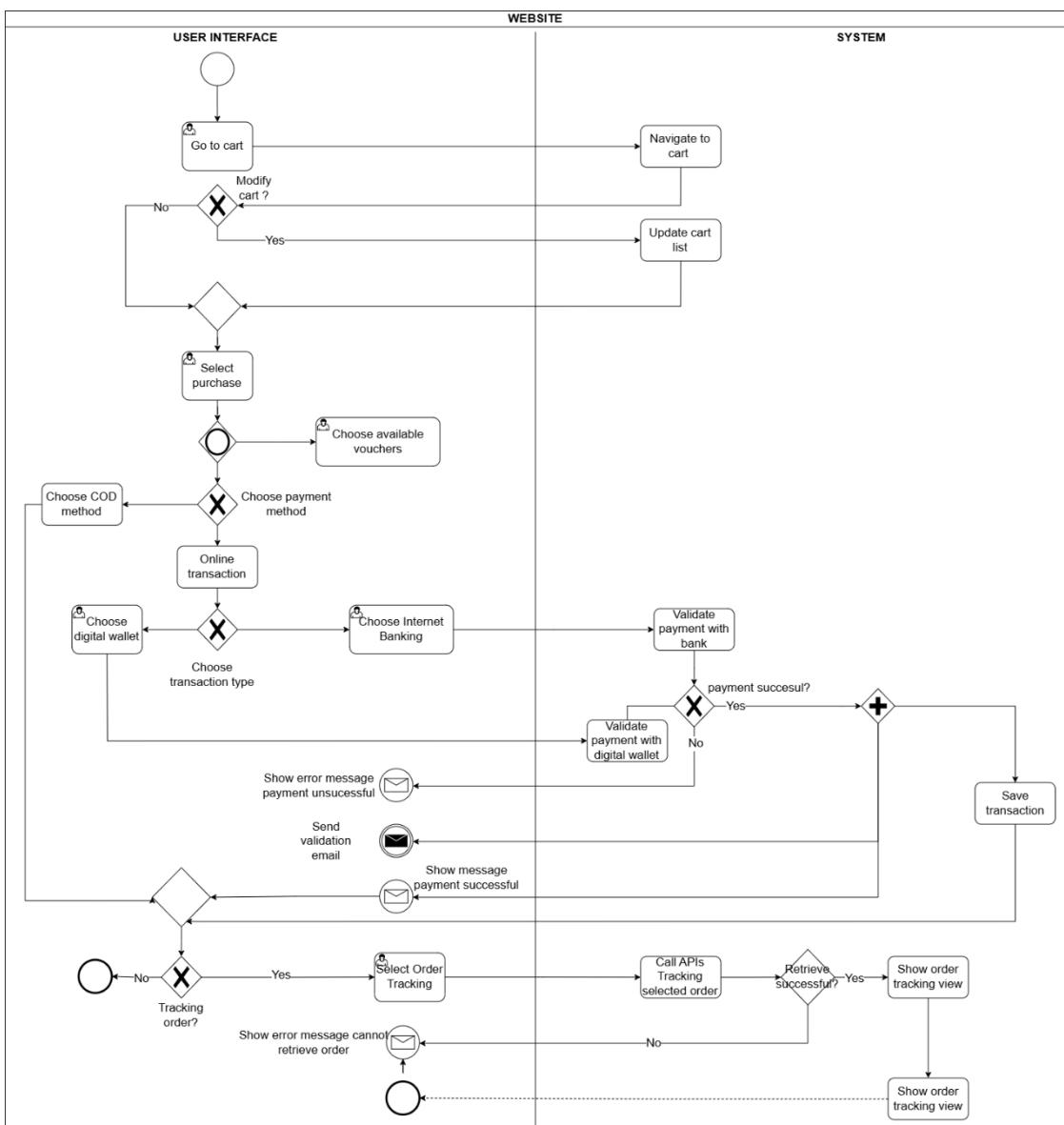


Figure 14: BPMN For Order To Payment And Immediate Order Tracking (Source: Authors)

3.2.9. Cancel Order

The process starts when the user accesses the order tracking site via the UI. Once the tracking interface is open, the user selects the "Cancel Order" option. This request is then sent to the backend for validation. Then, the system checks the current status of the order to determine its eligibility for cancellation. This involves two key decision points:

- Has the Order Been Shipped?

If the order has already been shipped, the system sends a message stating that cancellation is no longer possible. The workflow then transitions to display guidance for handling delivered orders, such as instructions for initiating a return.

- Is the Order Within the Cancellation Timeframe?

If the order is outside the allowable cancellation window, a message is displayed informing the user that the cancellation period has expired. The system also redirects users to guidance for product returns if applicable.

If the order has not been shipped and falls within the cancellation timeframe, the system processes the cancellation:

- The order status is updated to "Canceled."
- A refund is initiated, following the system's refund policy and payment method used by the customer.
- The user receives a notification confirming that the order has been successfully canceled.

For orders that cannot be canceled (either due to shipping status or expiration of the cancellation timeframe), the system ensures that users are not left unsupported:

- A detailed guidance interface is displayed, offering options to return products or seek additional support from customer service.
- This proactive approach helps maintain customer satisfaction by providing alternative solutions.

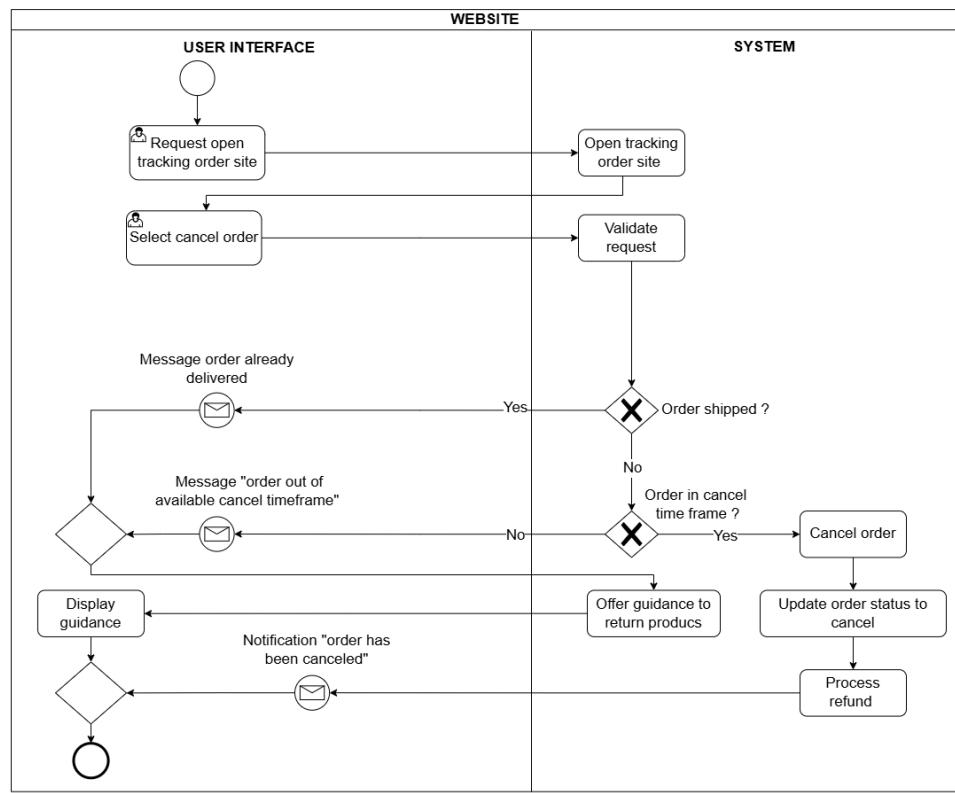


Figure 15: BPMN For Cancel Order (Source: Authors)

3.2.10. View Blog

Customers can choose a topic or a specific blog they are interested in to read. After selecting a topic, they can view the blogs within it and choose a blog to read. Once they finish reading, they can select other blogs within the same topic or a different topic. If they do not want to read anymore, the process ends.

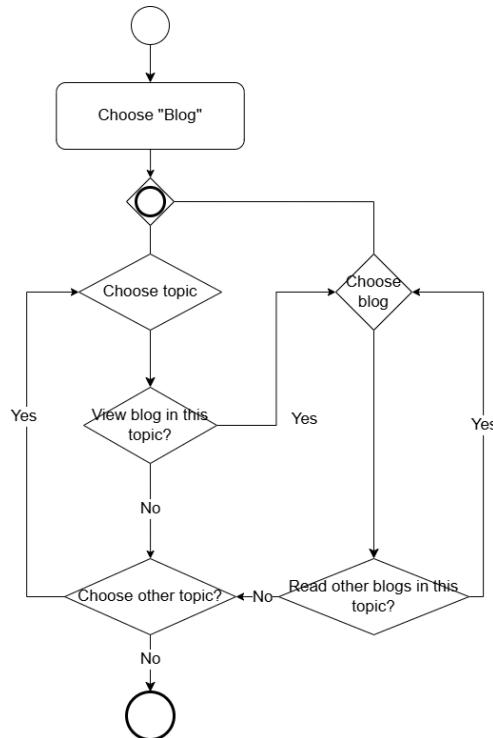


Figure 16: BPMN For View Blog (Source: Authors)

3.2.11. Contact Help

The "Contact Us" process flowchart illustrates the interaction between the User Interface (UI), System, and Staff to handle customer inquiries efficiently. The process begins when a user selects the "Contact Us" option on the website. The system then displays an input form, prompting the user to enter the required information. If the user chooses not to fill out the form, they are redirected back to the main page. However, if they provide the necessary details, they proceed by clicking the "Send" button to submit their query.

Once the query is submitted, the system receives the information and processes the request. The system then forwards the user's inquiry to the appropriate staff via an internal question-sending mechanism. At this stage, the staff is responsible for reviewing the query and providing a response. Upon receiving the inquiry, the staff replies, and the system delivers the response back to the user.

Finally, the user can access and view the answer through the interface, completing the communication cycle. This structured approach ensures a seamless and efficient

customer support process, reducing manual intervention while enhancing the overall user experience.

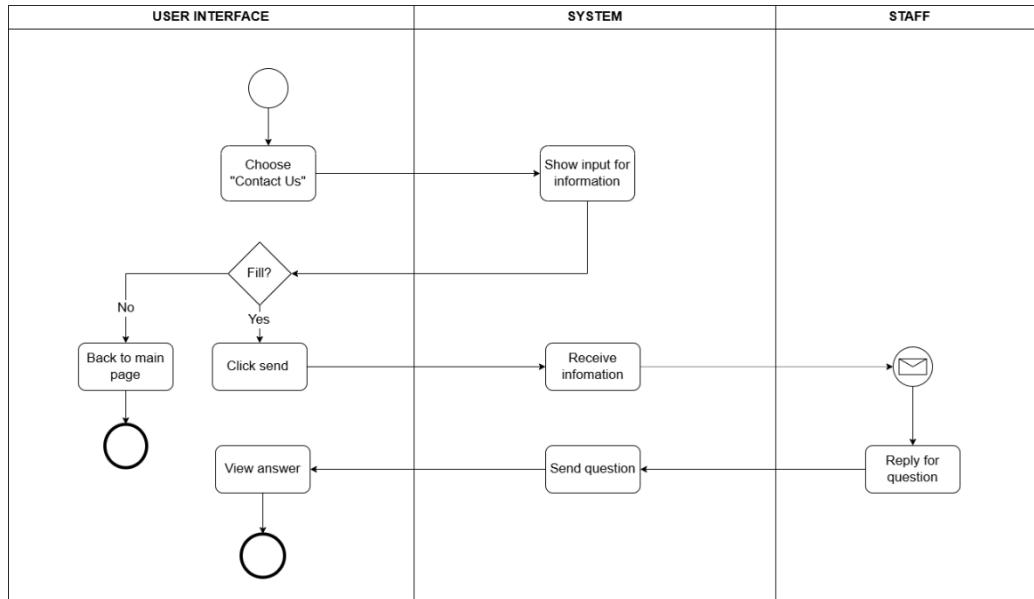


Figure 17: BPMN For Contact Help (Source: Authors)

3.2.12. Product Management

The process begins when the admin navigates to the "Product Management" section. The system displays a list of all products, including their names, prices, and stock levels. The admin selects a specific product to edit. The system retrieves detailed information about the selected product. The admin updates the product details, such as price, stock quantity, or description. The system validates the updated information. If invalid, the system displays an error message. If valid, the changes are saved in the database. The process concludes when the admin finishes managing the product information.

- The admin navigates to the "Product Management" section.
- The system displays the list of products.
- The admin selects a product to manage.
- The system retrieves the product details.
- The admin updates the product information.
- The system validates the updated details.

- + If invalid, an error message is displayed.
- + If valid, the changes are saved.
- The process ends when the admin completes the required actions

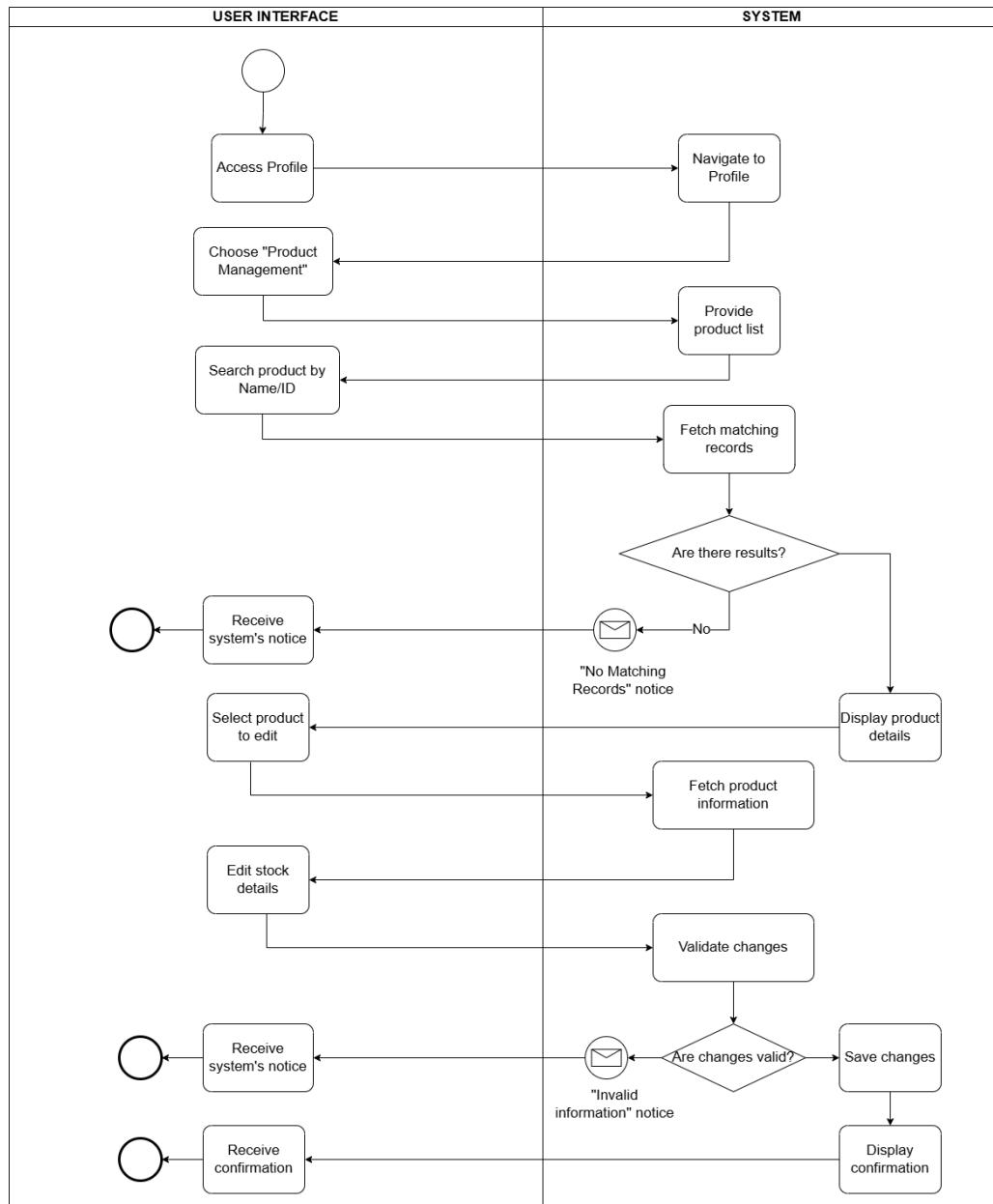


Figure 18: BPMN For Product Management (Source: Authors)

3.2.13. View Order History

The process begins when the user accesses the "Order History" section. The system retrieves all past orders from the database and displays them. The user can view

summary information for each order, such as order ID, date, and total cost. If the user selects a specific order, the system fetches detailed information. The user reviews the order details and has the option to reorder items. If the user chooses to reorder, the process redirects to the "Make Order and Checkout" process. The process ends when the user exits the "Order History" section or completes a reorder.

- The user navigates to the "Order History" section.
- The system retrieves and displays the list of past orders.
- The user views summary information for each order.
- The user selects a specific order to view details.
- The system fetches and displays the detailed order information.
- The user reviews the order details.
- The user decides whether to reorder items.
- + If the user chooses to reorder, the process redirects to the "Make Order and Checkout" process.
- The process ends when the user exits or completes a reorder.

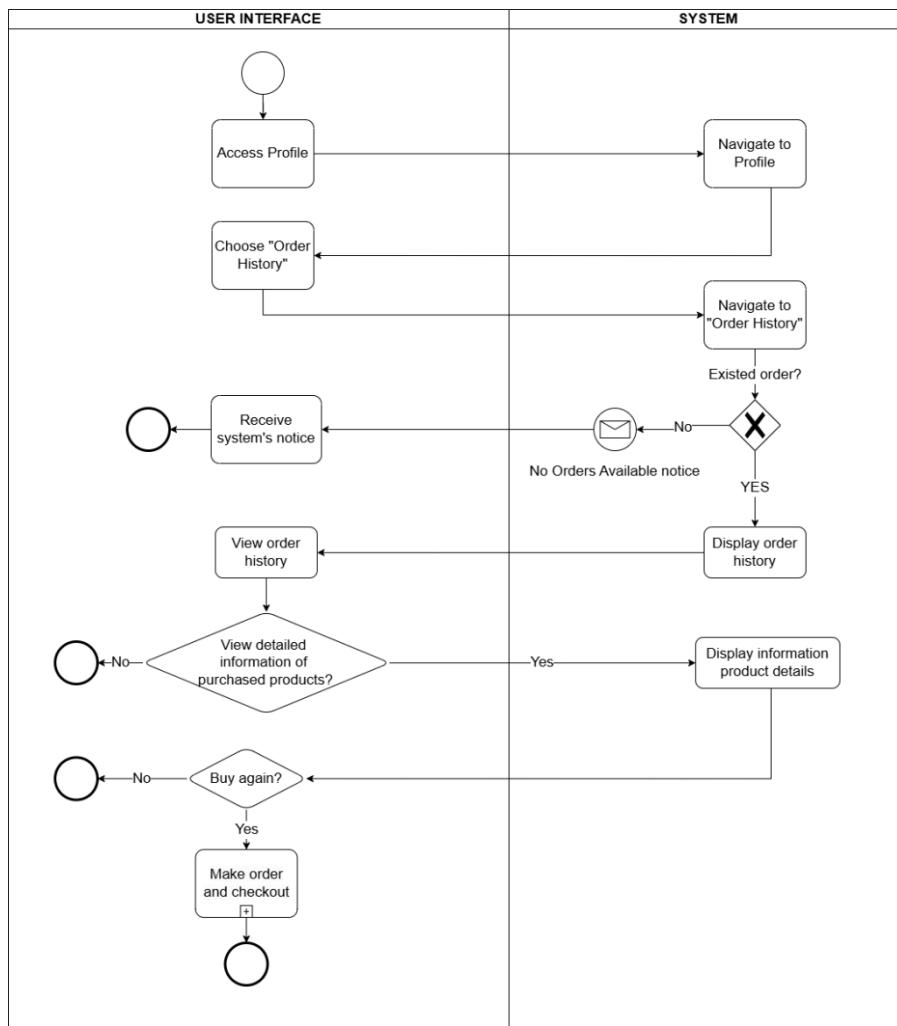


Figure 19: BPMN For View Order History (Source: Authors)

3.2.14. Management Service Reservations

The process begins when the admin accesses the "Services Reservation Management" section. The system displays a list of reservations, including the customer name, reservation date, service type, and status. The admin can select a specific reservation to review or update. The system retrieves detailed information about the selected reservation. The admin updates the reservation status, service type, or other relevant details. The system validates the updated information. If invalid, the system prompts the admin to correct the errors. If valid, the updated reservation information is saved in the database. Additionally, the system can send an updated confirmation email to the customer if applicable. The process ends when the admin completes all reservation management tasks.

- The admin accesses the "Services Reservation Management" section.
- The system retrieves and displays the list of reservations.
- The admin selects a reservation to manage.
- The system fetches the details of the selected reservation.
- The admin updates the reservation details (e.g., status, service type, or date).
- The system validates the updated information.
 - + If invalid, an error message prompts the admin to correct the errors.
 - + If valid, the changes are saved in the database.
- The system sends an updated confirmation email to the customer (optional).
- The process ends when the admin completes the required actions.

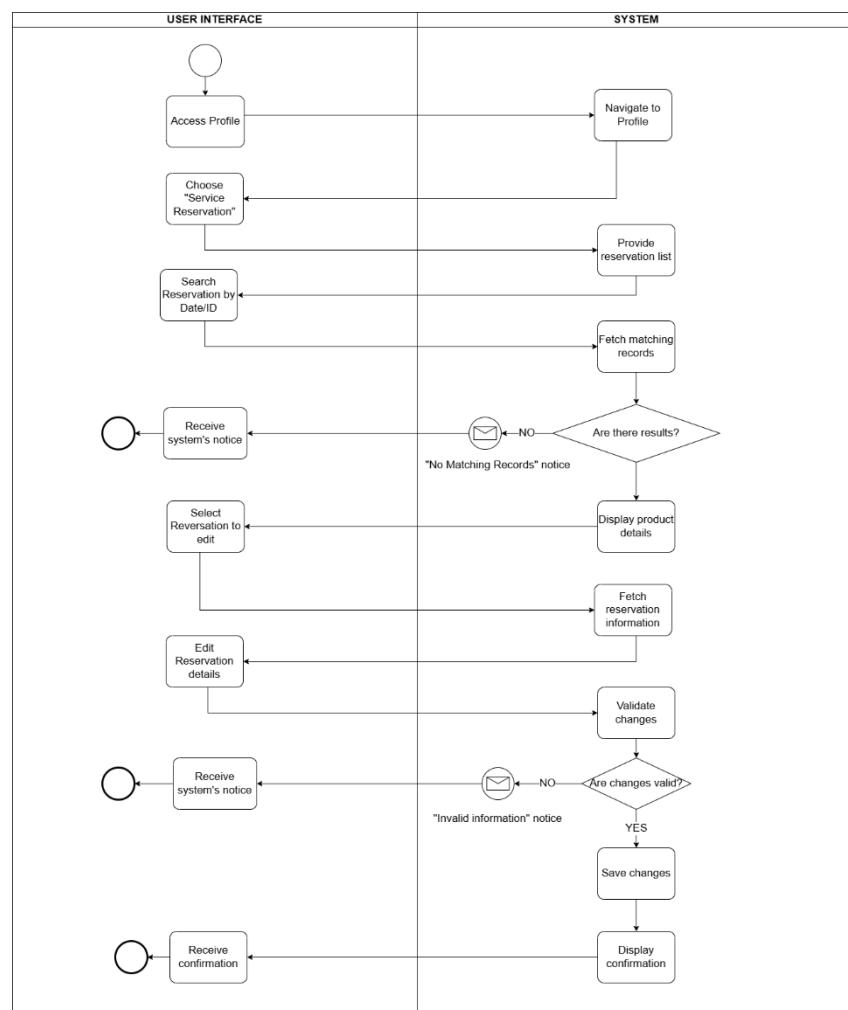


Figure 20: BPMN For Management Service Reservations (Source: Authors)

3.2.15. Validate/Confirm Order

The process begins when the admin accesses the "Order Management" section. The system displays a list of all customer orders, including order ID, customer name, order date, total amount, status, and payment method. The admin selects a specific order to review. The system retrieves and displays the order details, including products, quantity, price, delivery address, and payment status.

If the admin needs to validate the order, they review the information and ensure all required details are correct. If the order is invalid, the admin updates the necessary fields, such as payment confirmation or delivery address. The system validates the updated order details. If the validation fails, the system displays error messages for correction. If successful, the system updates the order status to "Validated" or "Ready for Shipment" and logs the changes. The process concludes when the admin finalizes all necessary validations and updates.

- The admin accesses the "Order Management" section.
- The system retrieves and displays a list of customer orders.
- The admin selects a specific order to manage.
- The system fetches and displays detailed order information (e.g., products, quantity, price, and delivery address).
 - The admin reviews the order details and validates them.
 - + If updates are needed, the admin edits the details (e.g., payment status or delivery address).
 - The system validates the updated order information.
 - + If invalid, the system prompts the admin with error messages for correction.
 - + If valid, the updated information is saved in the system.
 - The system updates the order status (e.g., "Validated," "Pending Payment," or "Ready for Shipment").

- The system logs all changes and optionally sends a confirmation email to the customer.
- The process ends when the admin completes all necessary actions for the selected order.

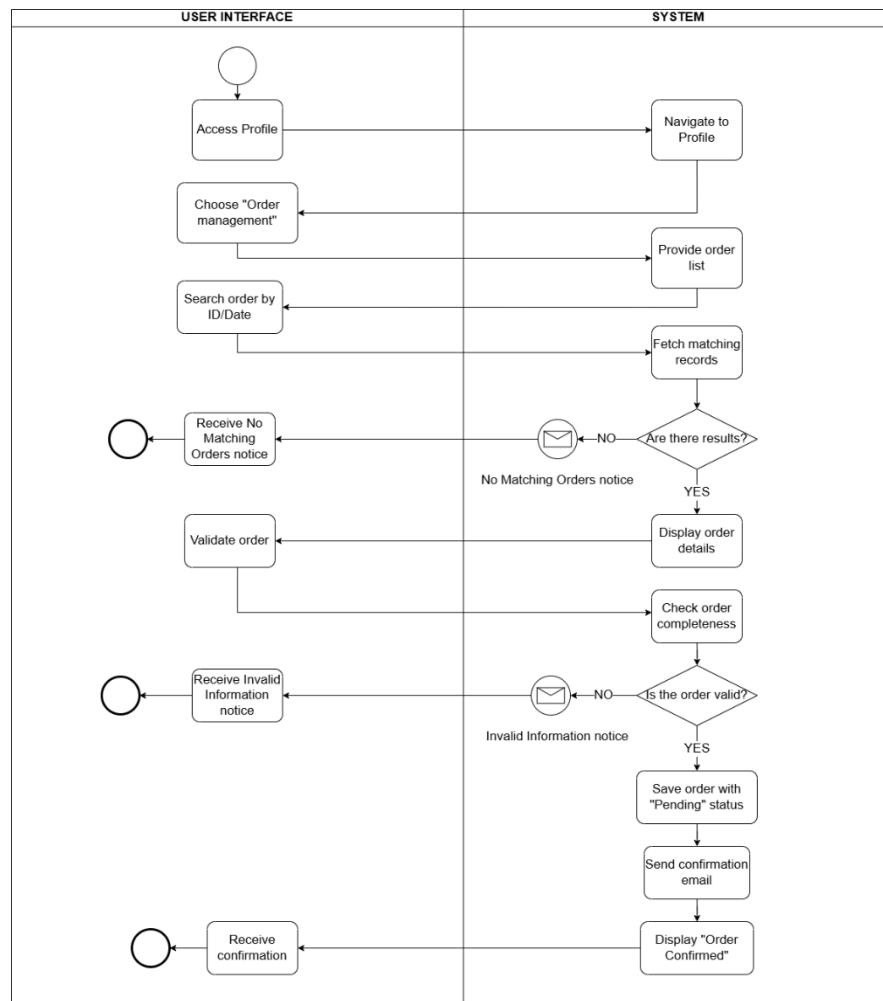


Figure 21: BPMN For Validate/Confirm Order (Source: Authors)

3.2.16. FAQs

The FAQ and Contact Request Process flowchart illustrates how users interact with the FAQ section and contact request system on a website. It details the process across two main components: User Interface (UI) and System.

The process begins when a user selects the FAQ pages from the UI. The system retrieves and displays FAQs from the database in response to the user's request.

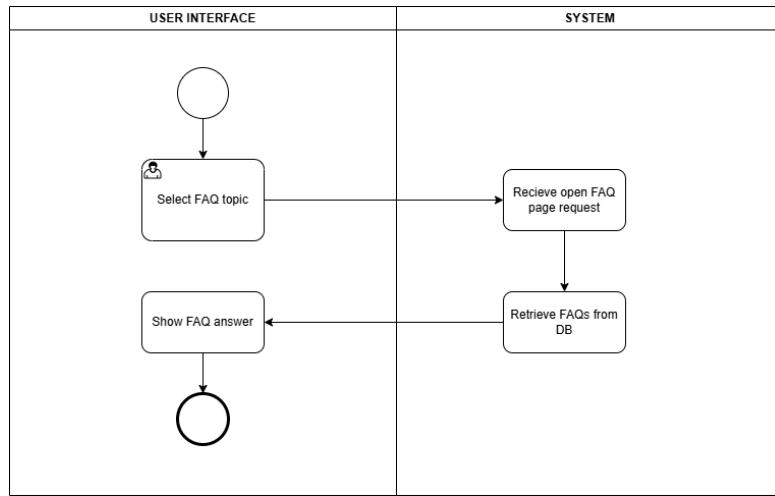


Figure 22: BPMN For FAQs (Source: Authors)

3.2.17. Customer Management

The process begins when the admin navigates to the "Customer Management" section. The system retrieves and displays a list of customers, including their basic details. The admin selects a specific customer to view or update. The system fetches detailed information about the selected customer. The admin updates the customer's details, such as their contact information or status. The system validates the updated information. If invalid, an error message is displayed. If valid, the changes are saved in the database. The process concludes when the admin finishes managing customer details.

- The admin accesses the "Customer Management" section.
- The system retrieves and displays the customer list.
- The admin selects a customer to manage.
- The system fetches the customer details.
- The admin updates the customer information.
- The system validates the updated details.
 - + If invalid, an error message is displayed.
 - + If valid, the changes are saved.
- The process ends when the admin completes the required actions.

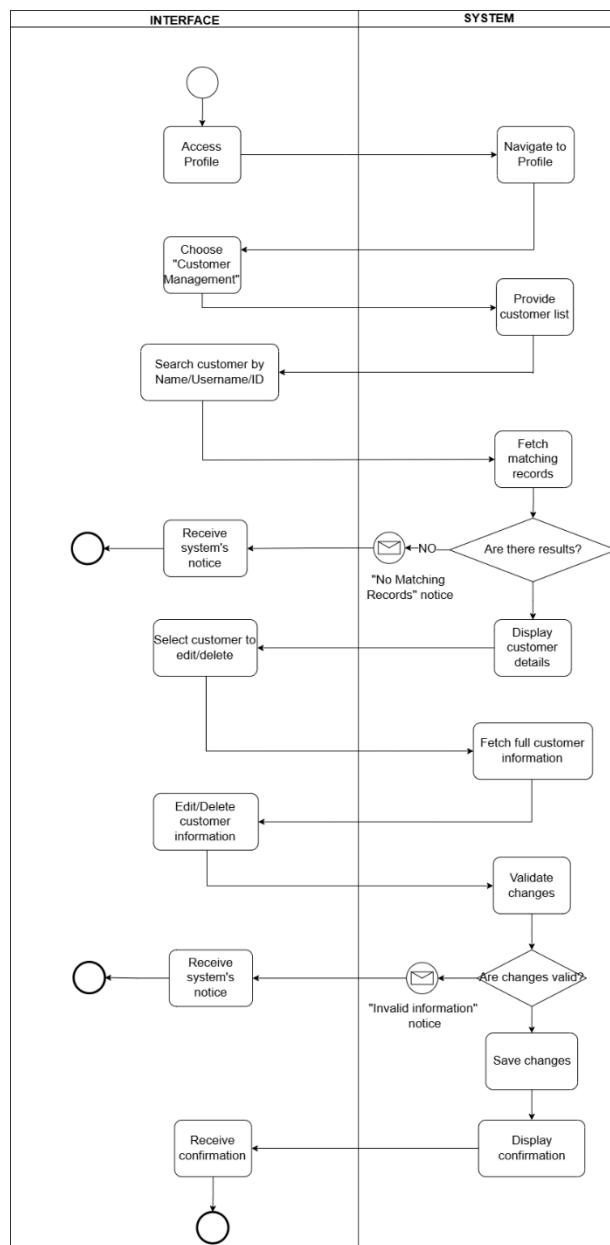


Figure 23: BPMN For Customer Management (Source: Authors)

3.3. Sequence Diagram

3.3.1. Sequence Diagram For Ordering

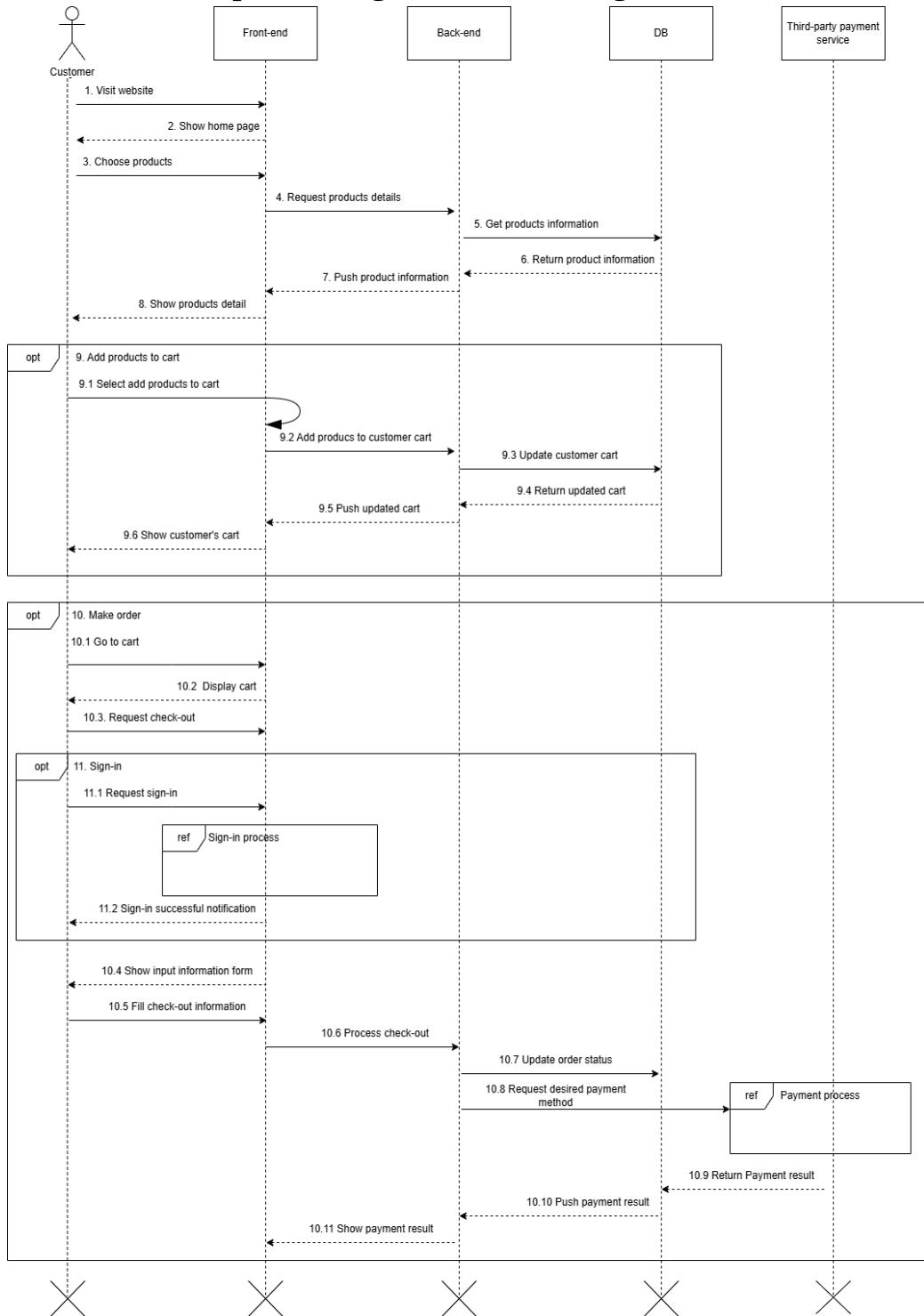


Figure 24: Sequence Diagram For Ordering (Source: Authors)

3.3.2. Sequence Diagram For Payment

Customers can choose one of the following payment methods: Cash on Delivery (COD) or Internet Banking

When clicking the "Checkout" button, customers can enter or select a discount code. The system will verify the discount code and display the total amount to be paid. Customers click "Confirm Payment" and enter their shipping address. Then, they choose a payment method:

- Cash on Delivery (COD):
 - + Customers simply click the "Confirm Payment" button.
 - + Payment will be made when the customer receives the order from the delivery service.
- Internet Banking:
 - + Customers can choose to pay via digital wallet or bank transfer.
 - + After selecting the preferred option, they click "Confirm" to proceed.
 - + The system will prompt the customer to enter their PIN code for authentication.
 - + If the PIN is correct, the payment is successful.
 - + If the PIN is incorrect, the system will display an error message and ask for re-entry.

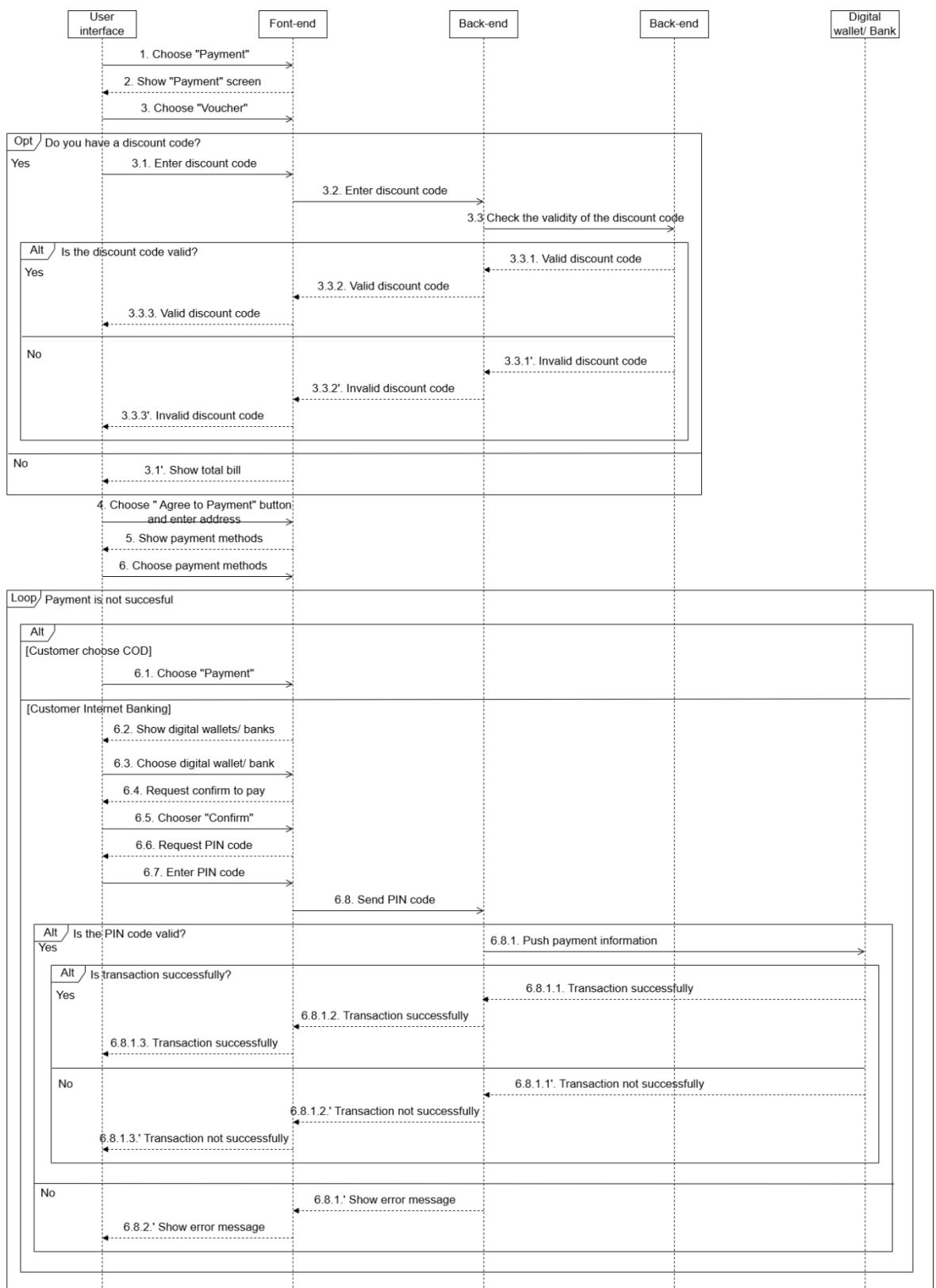


Figure 25: Sequence Diagram For Payment (Source: Authors)

3.4. Database design

3.3.1. Data Flow Diagram (DFD)

The system supports two main types of users: Customers and Admins.

The Customer uses the system to view and order products (including choosing materials and types) and book service appointments at Rebound Piercing. Customers must register for an account if they are first-time users and log in to place orders or book services. They can change their passwords and update their information on the Managing Account page.

Through the Product Management page, customers can view all of Rebound Piercing's services and products by using the search bar located at the top of the screen or by applying filters. Customers can place orders, book services, and adjust the order cart or appointment datetime as needed. After finalizing their orders, they proceed to the Payment function by selecting a payment method. The system integrates with the banks system and digital wallet system to process financial transactions. When a customer chooses to proceed with payment, the system sends a payment detail to the banks or a digital wallet. Upon successful processing, they send back a payment confirmation or failure notice, updating the transaction status within the system.

Customers can view their order information or order cart to make adjustments. If they change their minds about products or services, they can cancel their orders via the Cancel Order function, provided the products are not already in the "on-delivery" status. After a cancellation, Rebound Piercing processes the refund payment.

Rebound Piercing also supports customers through the Customer Service page, where they can request assistance by chatting with an admin or receiving automated support messages. Blogs about Rebound Piercing's collections, products, and more are provided to help customers gain deeper insight into the brand, increasing trust in Rebound Piercing.

The system includes the following data stores:

- Users Data Store: Stores customer information, order history, and account data.
- Product Data Store: Contains product details such as type, material, availability, pricing, and descriptions.
- Services Data Store: Contains information about services, including availability, pricing, and descriptions.
- Order Data Store: Holds order records, including both products and services, purchase dates, delivery dates, total cost, and order status (e.g., canceled or successful).
- These data stores ensure the system retains relevant information to manage customer interactions effectively.

The Admin is responsible for Product Management and Service Reservation Management, including updating product types, service bookings, pricing, and availability. They also manage Order Management and handle the Order Validation function. Additionally, Admins receive their account details upon logging into the Admin system, allowing them to manage product and service availability, post blogs, and provide customer service efficiently.

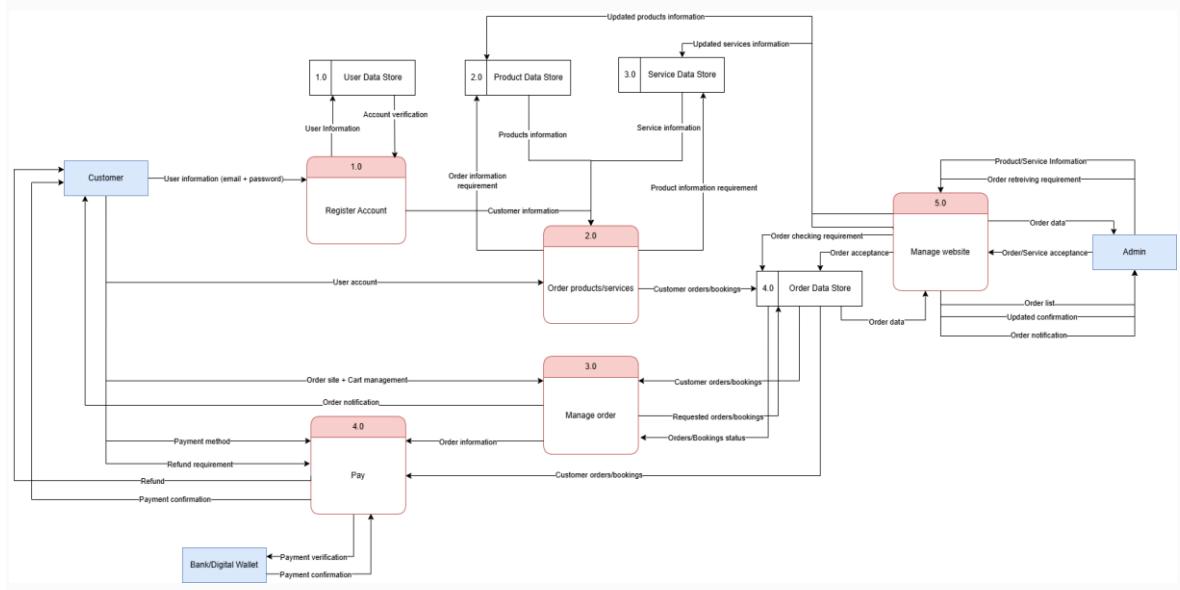


Figure 26: DFD Context (Source: Authors)

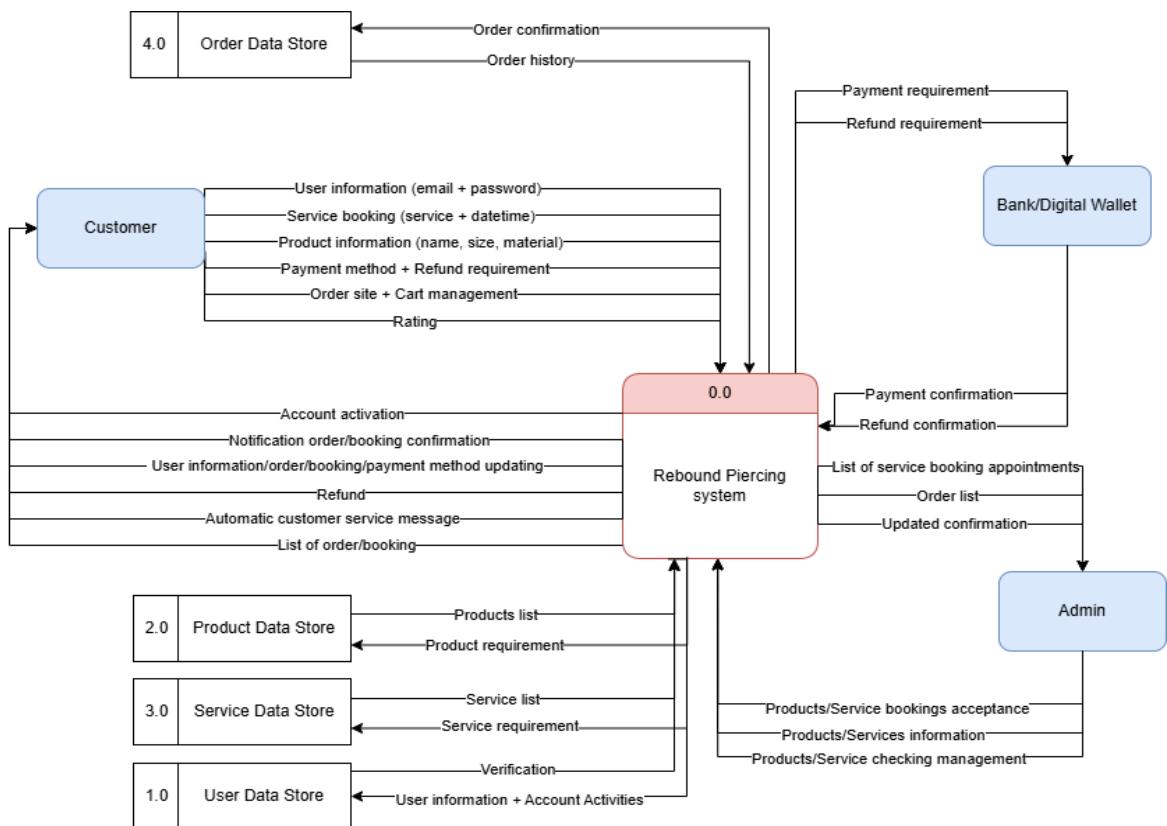


Figure 27: DFD Level 0 (Source: Authors)

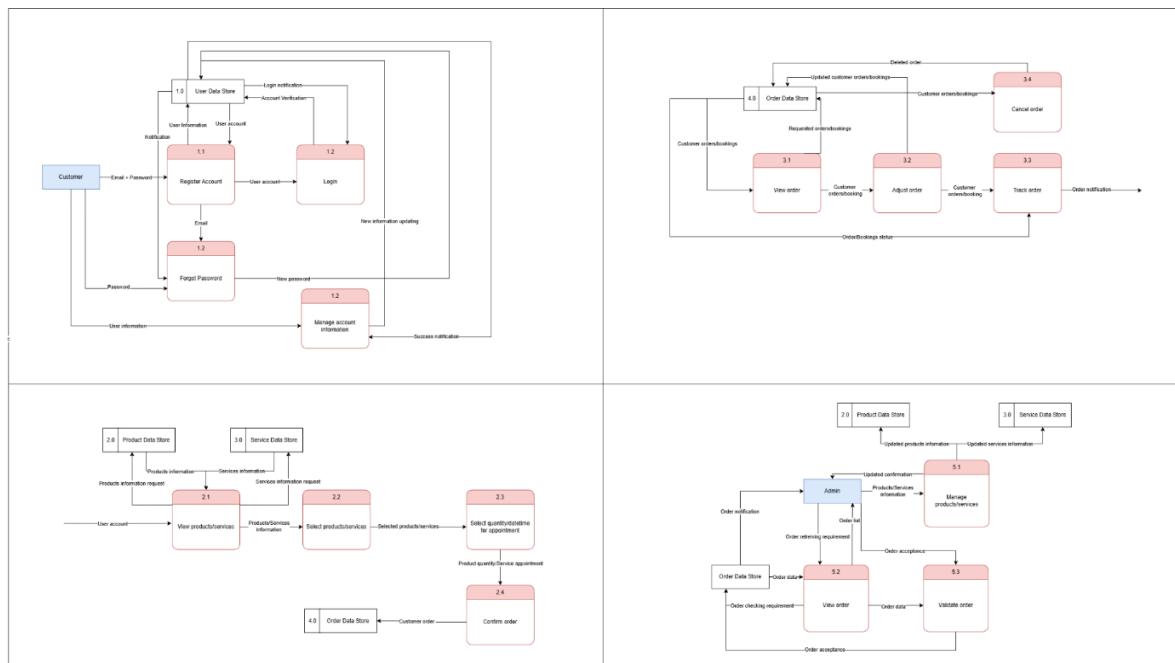


Figure 28: DFD Level 1 (Source: Authors)

3.3.2. Collection Schema Definition

| Collection | Field | Data Type | Description |
|------------|-----------------------------|-----------|--|
| Customer | Customer_ID | String | Unique identifier for each customer |
| | Customer_Name | String | Full name of the customer. |
| | Customer_Email | String | Email address of the customer. |
| | Customer_Phone | Int32 | Phone number of the customer. |
| | Customer_DOB | Date | Date of birth of the customer. |
| | Customer_Address | String | Residential address of the customer. |
| | Customer_Gender | String | Gender of the customer (e.g., Male, Female, Other). |
| | Customer_Registrati on_Date | Date | Date when the customer registered on the system. |
| | Customer_Type | String | <p>Here is the classification of customers based on total order value:</p> <ul style="list-style-type: none"> - Member: Customers who have an account on the system. - Loyal: Customers with a total order value of 5,000,000 VND. |

| | | | |
|----------------|---------------------|-----------------|--|
| | | | - VIP: Customers with a total order value of 20,000,000 VND. |
| Product | Product_ID | String | Unique identifier for each product. |
| | Product_Name | String | Name of the product. |
| | Product_Price | Float | Price of the product. |
| | Product_Image | String (URL) | URL of the product image. |
| | Product_Description | String | Description of the product. |
| | Product_Category | String | Category of products: Basic Piercing, High-Quality Jewelry, Premium Jewelry) |
| | Product_Status | String | Status of product: Inactive/Active |
| | Product-Origin | Date | Products origin |
| | Product_Stock | Integer | Available stock quantity of the product |
| | Product_Customize | String | Customization note of customer |
| Service | Service_ID | String | Unique identifier for each service. |

| | | | |
|--------------|---------------------|-----------------|--|
| | Service_Name | String | Name of the service. |
| | Service_Type | String | The type of service: - Piercing Service - After-care Service |
| | Service_Description | String | Description of the service. |
| | Service Image | String (URL) | URL of the service's featured image. |
| Order | Order_ID | String | Unique identifier for each order. |
| | Order_Date | Date | Date when the order was placed. |
| | Order_Quantity | Int32 | Quantity of products in the order. |
| | Product_ID | String | ID of the product associated with the order. |
| | Customer_ID | String | ID of the customer who placed the order. |
| | Payment_ID | String | Unique identifier for each payment. |

| | | | |
|-----------------|----------------------|----------|---|
| | Payment_Method | String | Payment method used for the order (e.g., Cash, Voucher, Bank Transfer). |
| | Order_Total_Price | Float | Total price of the order. |
| | Delivery_Method | String | Delivery method chosen for the order (e.g., Pickup, Home Delivery). |
| | Order_Status | String | Status of the order (e.g., Pending, Completed, Cancelled). |
| | Order_Note | String | Additional notes provided by the customer regarding the order. |
| Reservatio n | Reservation_ID | String | Reservation unique ID |
| | Status | String | Status for the reservation |
| | Appointment_Time | Datetime | Reservation schedule |
| | Reservation_Location | String | Location took place reservation: 4 branches |
| | Reservation_Note | String | Reservation note |
| | Customer_ID | String | ID of the customer |
| | Customer_Name | String | Name of customer |

| | | | |
|----------------|-----------------------|--------|---|
| Payment | Payment_ID | String | Unique identifier for each payment transaction. |
| | Order_ID | String | Associated order for the payment. |
| | Payment_Method | String | Payment method used (Credit Card, Cash on Delivery, Momo) |
| | Payment_Status | String | Status of the payment (Completed, Pending). |
| | Payment_Date | Date | Date when the payment was processed. |
| | Payment_Amount | Float | Amount paid for the order. |
| Blog | Blog_ID | String | Unique identifier for each blog post. |
| | Blog_Title | String | Title of the blog post. |
| | Blog_fullContent | String | Content of the blog post. |
| | Blog_Date | Date | Date when the blog post was published. |
| | Blog_shortDescription | String | Short description for the content |
| | Blog_Category | String | Category of the content |

| | | | |
|--|------------|-----------------|-----------------------------------|
| | Blog_Image | String (URL) | URL of the blog's featured image. |
|--|------------|-----------------|-----------------------------------|

Table 35: Collection Schema Definition (Source: Authors)

CHAPTER 4: BUILD AND IMPLEMENT

4.1. Site map

4.1.1. Sitemap for User Interface Website

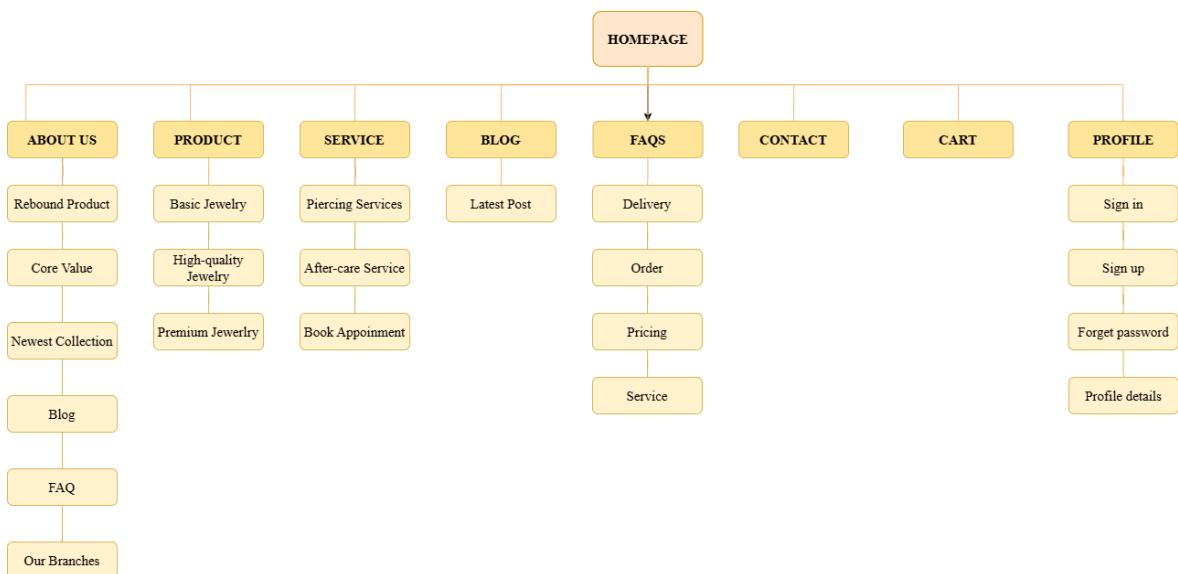


Figure 29: Sitemap For User Interface (Source: Authors)

4.1.2. Sitemap for Admin Interface Website

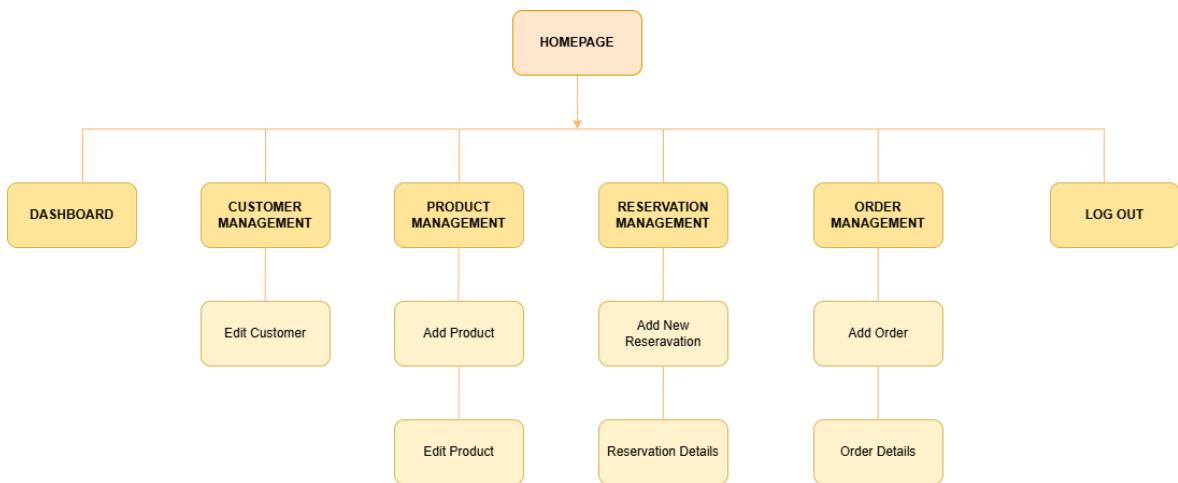


Figure 30: Sitemap For Admin Interface Website (Source: Authors)

4.2. Design Information



Figure 31: Rebound Piercing Logo (Source: Authors)

4.2.1. Buttons Components

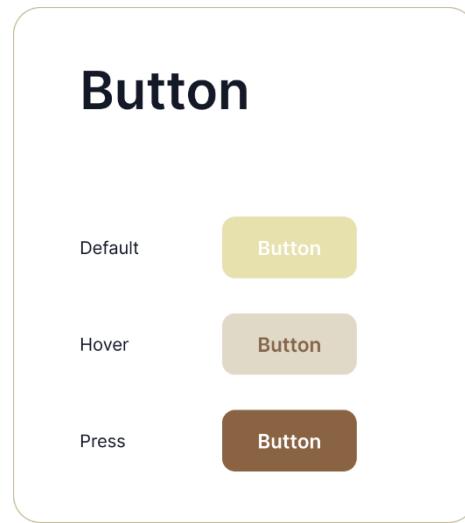


Figure 32: Button Component (Source: Authors)

4.2.2. Color Library

Colors



Figure 33: Color Library (Source: Authors)

4.2.3. Typography

Font

Montserrat

Figure 34: Typography (Source: Authors)

Typography

Text Font

| Typeface | Weight | Size | Line | Spacing |
|---------------------|-----------|------|------|---------|
| H1. Headline | Semi Bold | 48 | 58 | 0 |
| H2. Headline | Semi Bold | 40 | 48 | 0 |
| H3. Headline | Semi Bold | 32 | 38 | 0 |
| H4. Headline | Semi Bold | 28 | 34 | 0 |
| H5. Headline | Semi Bold | 24 | 28 | 0 |
| S1. Subtitle | Semi Bold | 18 | 28 | 0 |
| S2. Subtitle | Semi Bold | 16 | 24 | 0 |
| B1. Body | Regular | 16 | 24 | 0 |
| B2. Body | Medium | 16 | 24 | 0 |
| B3. Body | Regular | 14 | 20 | 0 |
| B4. Body | Medium | 14 | 20 | 0 |
| C1. Caption | Regular | 12 | 16 | 0 |
| C2. Caption | Medium | 12 | 16 | 0 |
| C3. Caption | Medium | 10 | 14 | 0 |
| LABEL | Medium | 12 | 16 | 0 |

Button Font

| Typeface | Weight | Size | Line | Spacing |
|---------------|-----------|------|------|---------|
| Giant | Semi Bold | 18 | 24 | 0 |
| Large | Semi Bold | 16 | 20 | 0 |
| Medium | Semi Bold | 14 | 16 | 0 |
| Small | Semi Bold | 12 | 16 | 0 |
| Tiny | Semi Bold | 10 | 12 | 0 |

Figure 35: Typography 2 (Source: Authors)

4.2.4. Icon instant

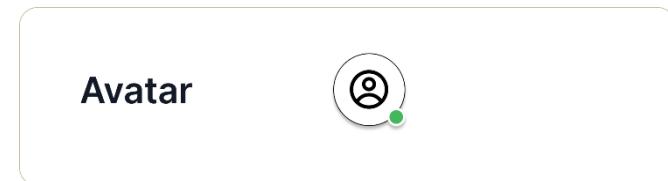


Figure 36: Avatar (Source: Authors)

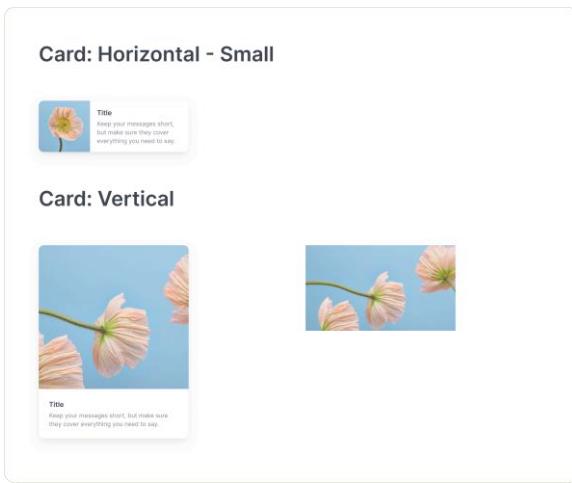


Figure 37: Card (Source: Authors)

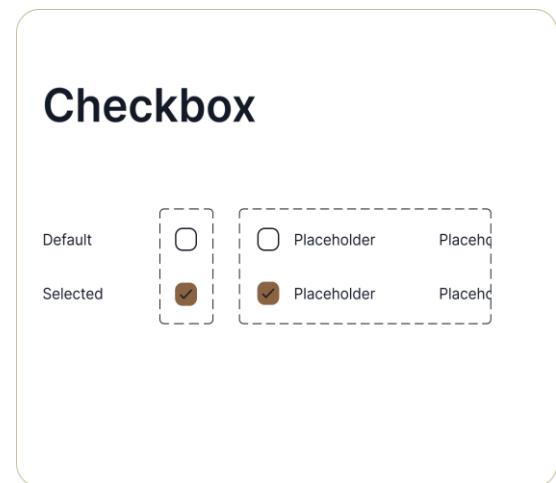


Figure 38: Checkbox (Source: Authors)

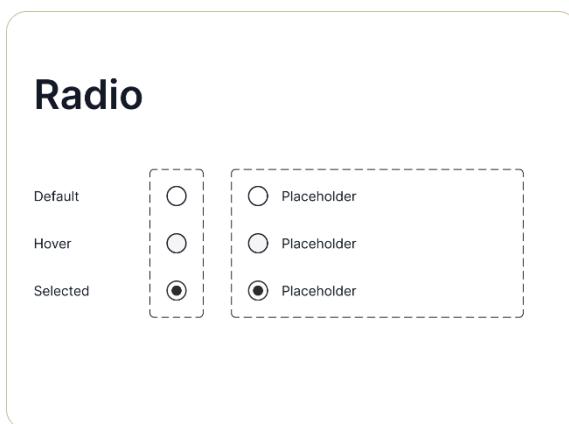


Figure 39: Radio (Source: Authors)

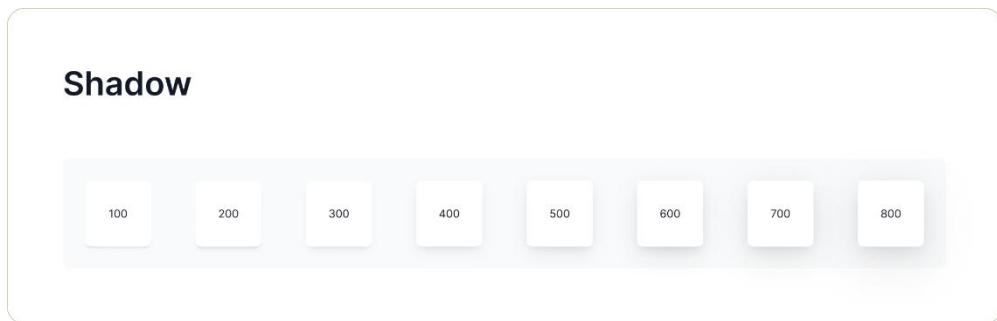


Figure 40: Shadow (Source: Authors)

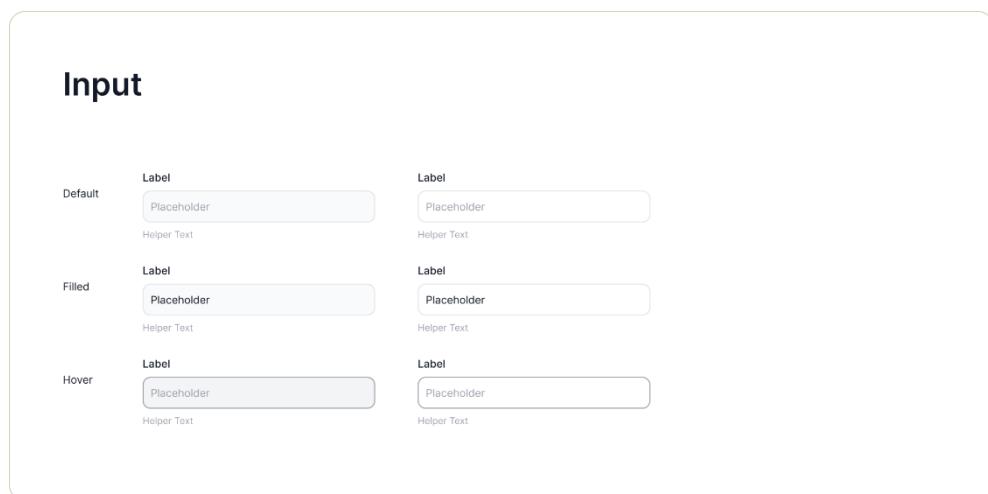


Figure 41: Input (Source: Authors)

4.3. Functions

4.3.1. E-Commerce Functionality

| 1: ORDER MANAGEMENT FUNCTIONALITY | |
|-----------------------------------|---|
| ID | Requirement |
| 1.1. Product Ordering | Customers can easily order piercing jewelry and accessories through a seamless website process with clear product details, images, and pricing. |
| 1.2. Product Search | A powerful search function delivers relevant results in real-time, saving time for specific product searches. |
| 1.3. Order History & Cart | Customers can track purchases, view current orders, and manage shopping carts. |
| 1.4. Order Cancellation | Customers can request cancellations or refunds for eligible orders. |

Table 36: Order Management Functionality (Source: Authors)

| 2: PAYMENT MANAGEMENT FUNCTIONALITY | |
|-------------------------------------|--|
| ID | Requirement |
| 2.1. Payment Processing | Multiple secure payment methods, including cards, bank transfers, and e-wallets, ensure easy checkout. |

Table 37: Payment Management Functionality (Source: Authors)

| 3: SERVICE BOOKING FUNCTIONALITY | |
|---|---|
| ID | Requirement |
| 3.1. Service Booking | Customers must be able to book piercing services online. |

Table 38: Service Booking Functionality (Source: Authors)

| 4: CUSTOMER ENGAGEMENT & SUPPORT FUNCTIONALITY | |
|---|--|
| ID | Requirement |
| 4.1. Blog Viewing | Provide a blog section featuring aftercare tips, trends, and updates. |
| 4.2. Popup Registration | Implement live chat support for customer inquiries |
| 4.3. FAQs Viewing | Allow customers to subscribe to newsletters and promotions . |

Table 39: Customer Engagement & Support Functionality (Source: Authors)

| 5: CUSTOMER PROFILE MANAGEMENT FUNCTIONALITY | |
|---|--|
| ID | Requirement |
| 5.1. Login | Allows users to authenticate using their credentials (email/username and password) to access their personal profile. |
| 5.2. Reset Password | Enables users to securely reset their password via email verification or security questions if they forget it. |
| 5.3. Update Information | Users can modify personal details like name, contact information, and profile picture. |

| | |
|-------------------|---|
| 5.4. View Profile | Displays user information, including account details and preferences, in a structured format. |
|-------------------|---|

Table 40: Customer Profile Management Functionality (Source: Authors)

4.3.2. Admin Dashboard & Management

| 6: ADMIN PRODUCT MANAGEMENT FUNCTIONALITY | |
|--|--|
| ID | Requirement |
| 6.1. Add Products | Admins can add new products with details such as name, price, category, and images. |
| 6.2. Edit Products | Allows updating product information, including descriptions, prices, and availability. |
| 6.3. Edit Stocks | Enables stock level adjustments to track inventory changes. |

Table 41: Admin Product Management Functionality (Source: Authors)

| 7: ADMIN SERVICE MANAGEMENT FUNCTIONALITY | |
|--|--|
| ID | Requirement |
| 7.1. View Reservations | Admins can check customer reservations for services. |
| 7.2. Manage Reservations | Allows modifications, cancellations, or confirmations of bookings. |

Table 42: Admin Service Management Functionality (Source: Authors)

| 8: ADMIN CUSTOMER MANAGEMENT FUNCTIONALITY | |
|---|--|
| ID | Requirement |
| 8.1. Edit Customer | Admins can update customer details like contact information and preferences. |

Table 43: Admin Customer Functionality (Source: Authors)

| 9: ADMIN SERVICE MANAGEMENT FUNCTIONALITY | |
|--|--------------------|
| ID | Requirement |

| | |
|---------------------|--|
| 9.1. View Order | Displays a list of customer orders with details such as status and payment method. |
| 9.2. Validate Order | Confirms order authenticity and updates order status accordingly. |

Table 44: Admin Service Management Functionality (Source: Authors)

| 10: ADMIN PROFILE MANAGEMENT FUNCTIONALITY | |
|---|---|
| ID | Requirement |
| 10.1. Login | Admin authentication to access the dashboard. |
| RC 10.2. Reset Password | Allows admins to reset their password securely. |

Table 45: Admin Profile Management Functionality (Source: Authors)

4.4. Website Requirements

4.4.1. Content

- A comprehensive introduction to Rebound Piercing, including its brand story, mission, and product offerings.
- User authentication: Customers can register and log in to their accounts for a personalized shopping experience.
- Product display: Earrings and piercing jewelry are categorized into groups (e.g., earrings, nose piercings, belly button piercings) and classified by attributes like material (Silver 925, titanium, gold) to help customers easily find their desired styles.
- Detailed product descriptions: Each product page provides clear, concise details, including materials, design inspiration, piercing compatibility, and hypoallergenic properties.
- Ordering functionality: Customers can place orders directly on the website, add or remove items from their cart, apply discount codes (if available), and input order notes, delivery address, and preferred shipping method.

- Payment options: Support for QR code payment, bank transfer, and vouchers, ensuring secure transactions.
- Customer support: The website features automated support channels, FAQs, and a contact section with store details, hotline, email, and links to social media (Facebook, Instagram, TikTok).
- Aftercare & policies: Provides clear guidelines on piercing aftercare, return & exchange policies, and terms of service to ensure transparency.

4.4.2. Interface

- A minimalist, premium, and elegant layout, aligning with Rebound Piercing's branding while ensuring a seamless user experience.
- Smart navigation bar with clear categories for easy browsing.
- High-quality product images: Each product has multiple sharp, realistic images to showcase fine details and craftsmanship.
- Color balance: The interface uses aesthetic and harmonious tones that do not overpower the product display while maintaining a luxurious feel.

4.5. Wireframes

4.5.1. Wireframe for User Interface

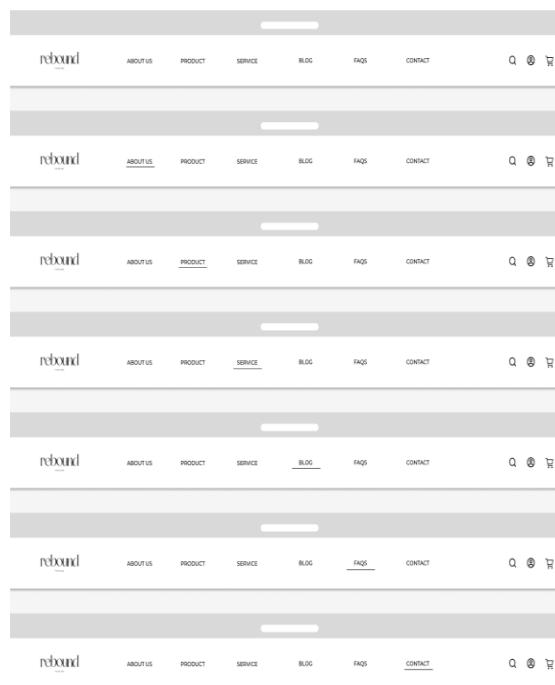


Figure 42: Header Wireframe (Source: Authors)



Figure 43: Signup Wireframe (Source: Authors)



Figure 44: Footer Wireframe (Source: Authors)

Figure 45: Forgot Password Wireframe (Source: Authors)



Figure 46: About Us Wireframe (Source: Authors)

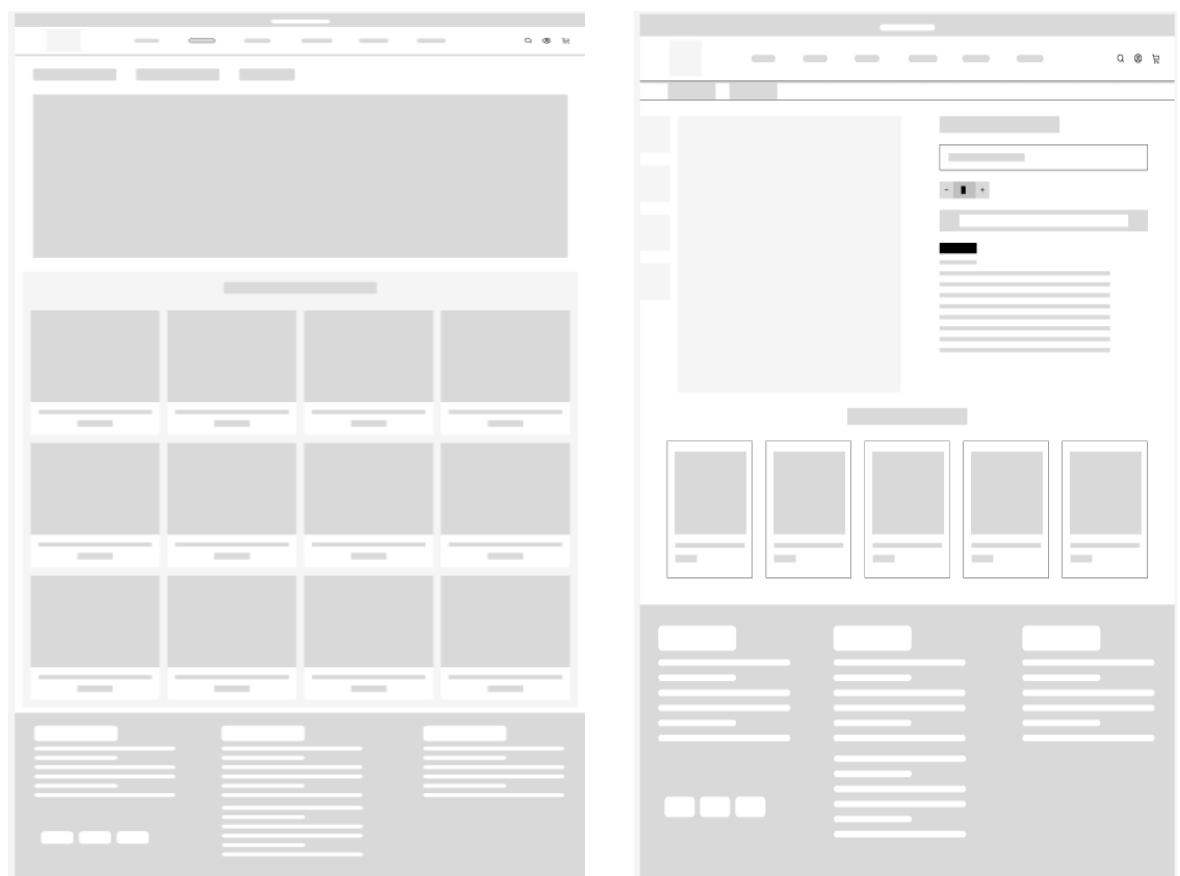


Figure 47: Product Page Wireframe (Source: Authors)



Figure 48: Service Page Wireframe (Source: Authors)



Figure 49: Cart Page Wireframe (Source: Authors)



Figure 50: Payment Page Wireframe (Source: Authors)

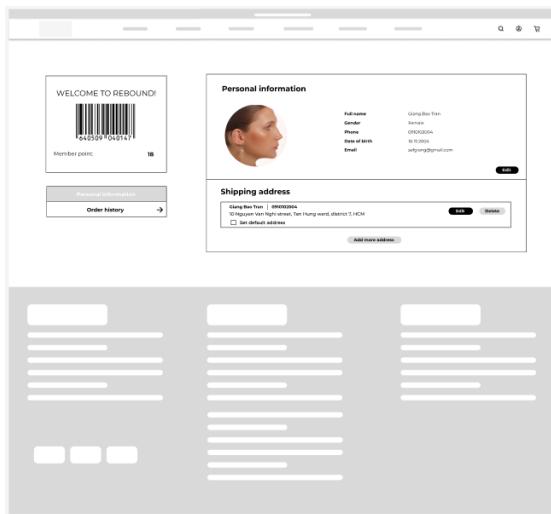


Figure 51: Profile Page Wireframe (Source: Authors)



Figure 52: Order Detail Page Wireframe (Source: Authors)



Figure 53: Blog Page Wireframe (Source: Authors)





Figure 54: FAQs Page Wireframe (Source: Authors)



Figure 55: Contact Page Wireframe (Source: Authors)

4.5.2. Wireframes for Admin Interface

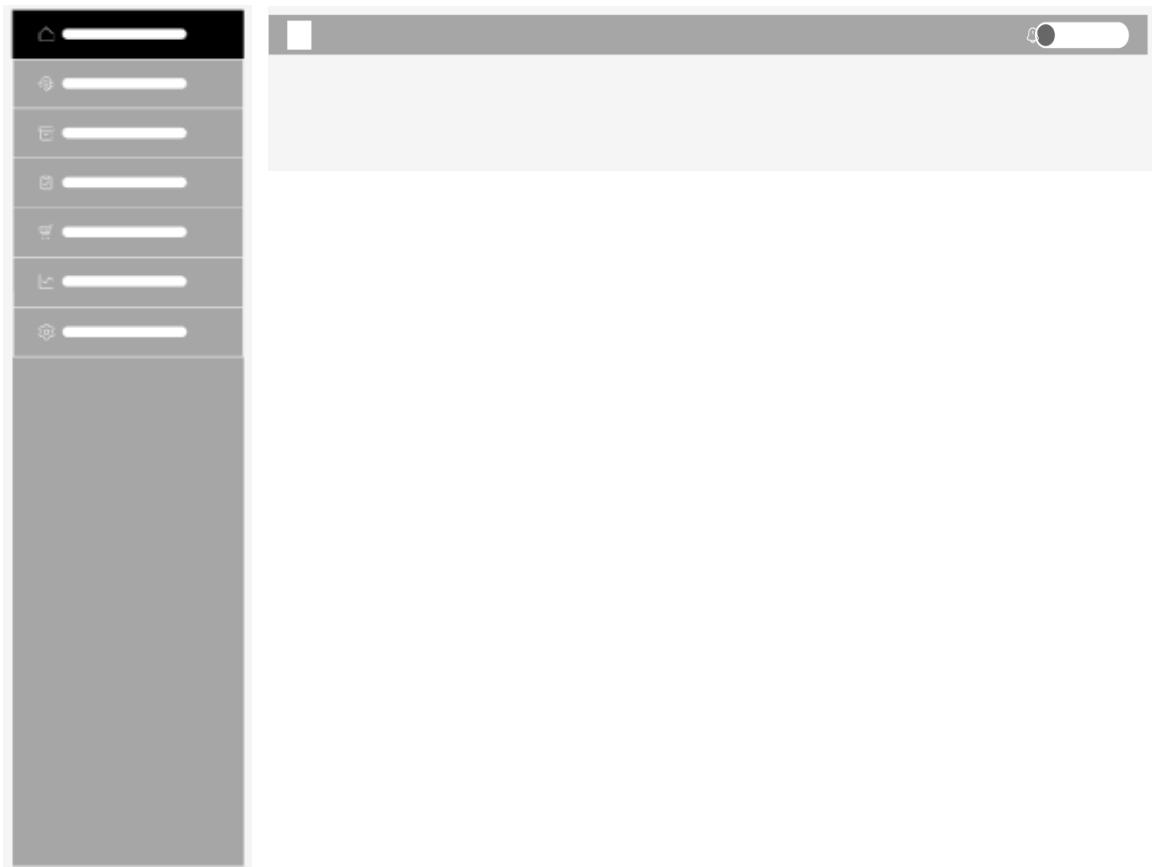


Figure 56: Sidebar And Header Wireframe (Source: Authors)



Figure 57: Login Wireframe (Source: Authors)



Figure 58: Homepage Wireframe (Source: Authors)

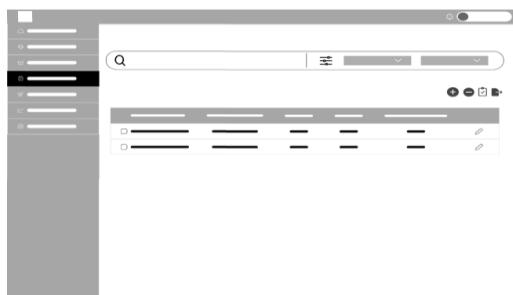


Figure 59: Management Reservation (Source: Authors)

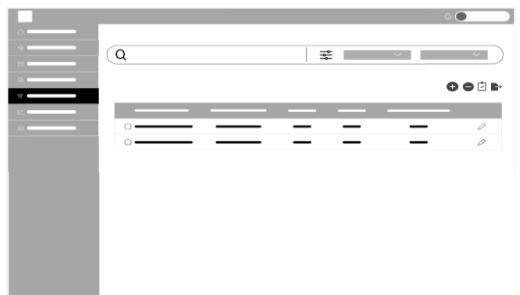


Figure 60: Managing & Validating Order (Source: Authors)



Figure 61: Customer Management (Source: Authors)



Figure 62: Edit Customer (Source: Authors)



Figure 63: Add Reservation Wireframe (Source: Authors)



Figure 64: Add Order Wireframe (Source: Authors)



Figure 65: Product Management (Source: Authors)



Figure 66: Add Product Wireframe (Source: Authors)



Figure 67: Reservation Detail Wireframe (Source: Authors)



Figure 68: Order Detail Wireframe (Source: Authors)



Figure 69: Edit Product Wireframe (Source: Authors)



Figure 70: Dashboard Wireframe (Source: Authors)



Figure 71: Logout Wireframe (Source: Authors)

4.6. High-Fidelity Design (Mock-ups)

4.6.1. Mock-up for User Interface



Figure 72: Header (Source: Authors)



Figure 73: Footer (Source: Authors)

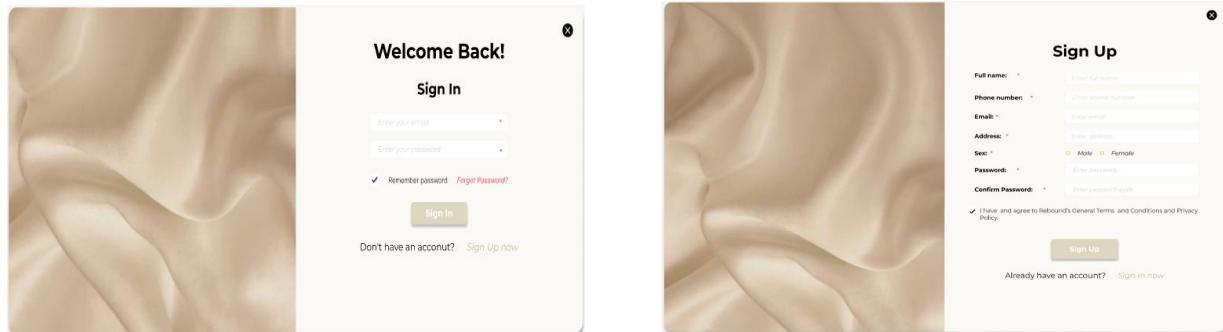


Figure 74: Signin/Signup Popup (Source: Authors)

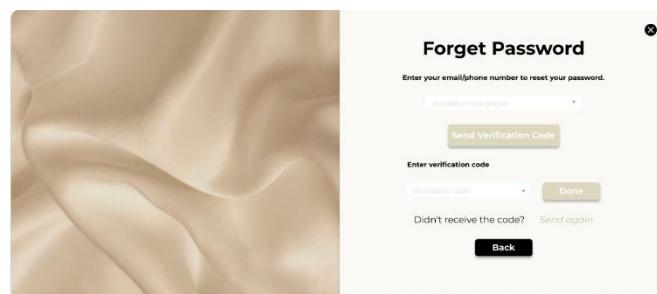


Figure 75: Forgot Password (Source: Authors)

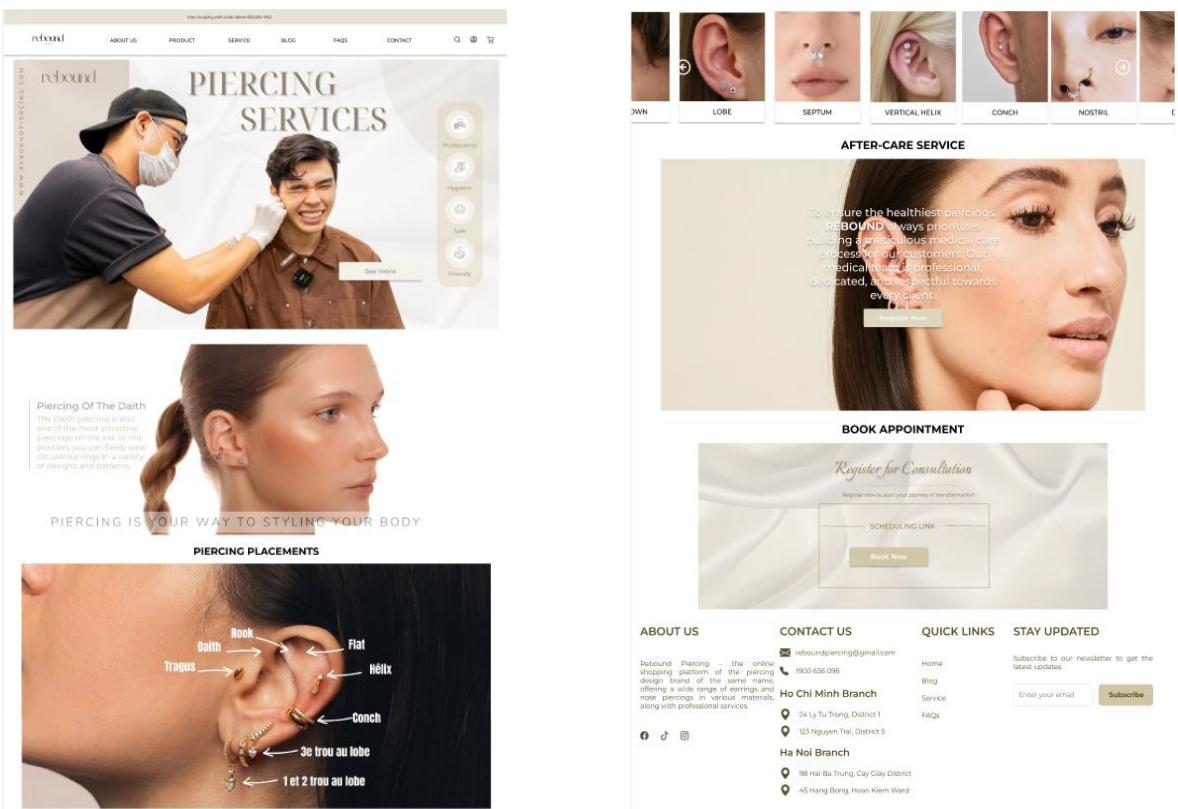


Figure 76: About Us (Source: Authors)

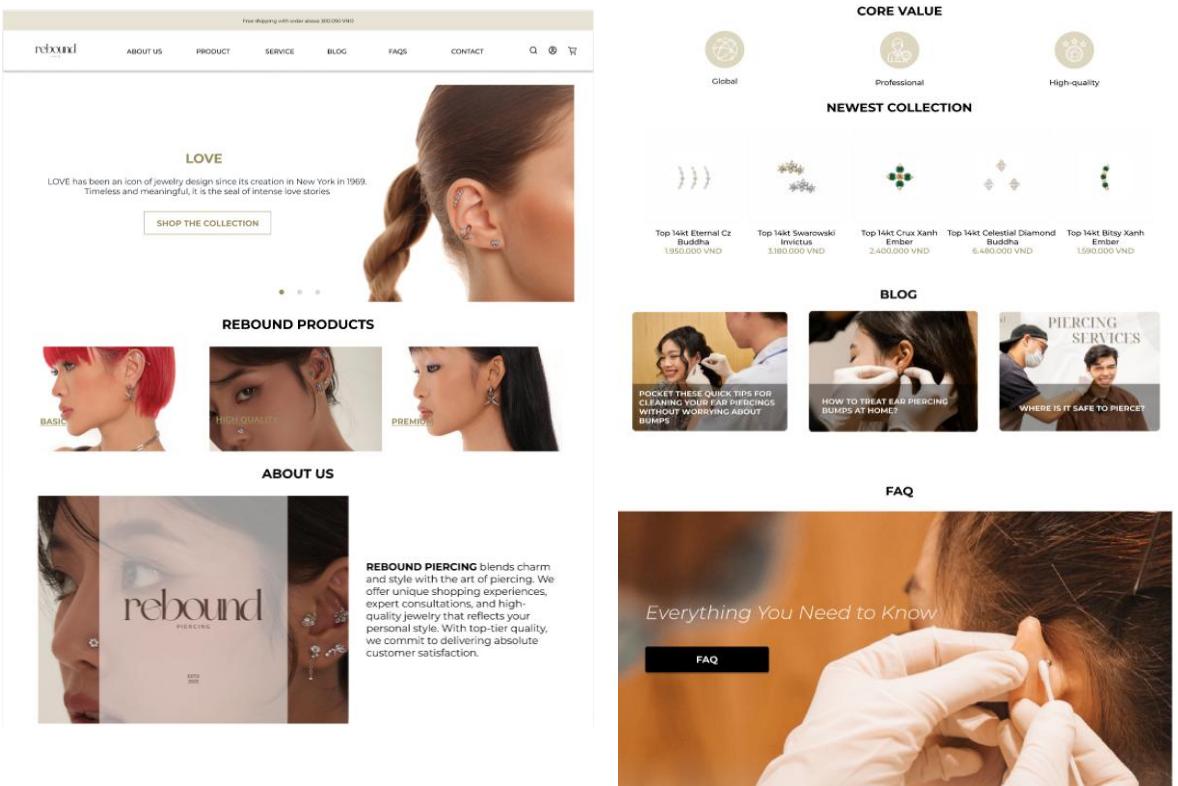


Figure 77: Service Page (Source: Authors)

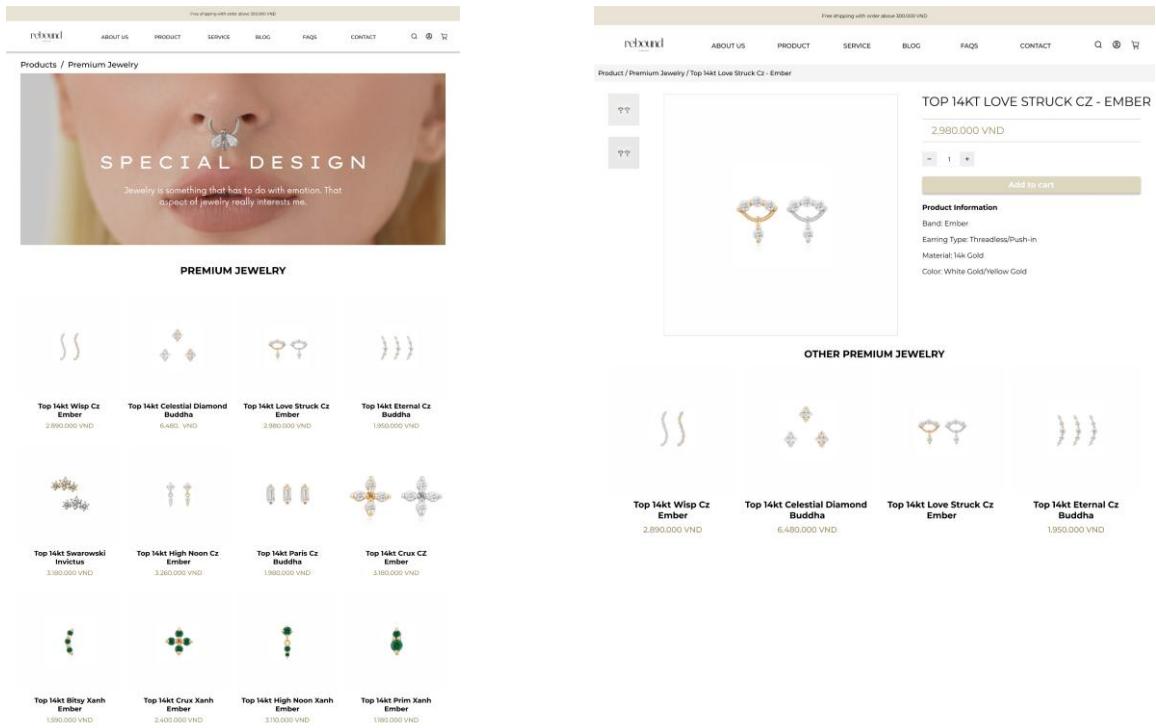


Figure 78: Product Page (Source: Authors)

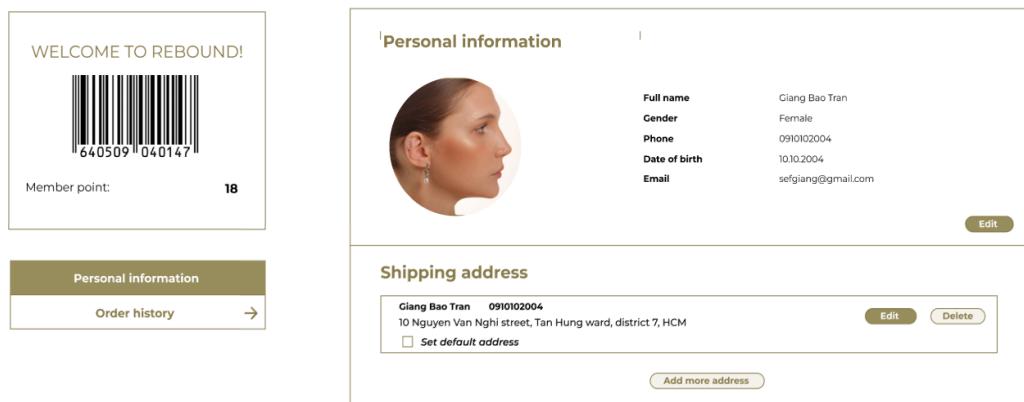


Figure 79: Profile Page (Source: Authors)

ORDER DETAILS

Order 154027 Confirming

| PRODUCT | PRICE | QUANTITY | SUBTOTAL |
|------------------------------------|---------|----------|----------|
| Round white gemstone stud earrings | 500000đ | 2 | 1000000đ |
| Shipping fee | 40000đ | | 0 |
| Total | | | 1040000đ |

Figure 80: Order Detail Page (Source: Authors)

Book A Piercing Appointment!

Enter your name *

Enter your phone number *

ddmmyy *

SUBMIT

Figure 81: Booking Process (Source: Authors)

BILLING & SHIPPING

YOUR ORDER

| PRODUCT | SUBTOTAL |
|-------------------------------------|-----------------|
| Tai Titan Da Tron Cham - TQ | 300.000đ |
| Set 12 khuyên có lỗ - Thép không gỉ | 320.000đ |
| Subtotal | 620.000đ |
| Shipping | 40.000đ |
| Total | 720.000đ |

Thanh toán khi nhận hàng / Cash on Delivery
khách thanh toán bằng tiền mặt

Thanh toán online Credit card/QR code

Tùy điều và đóng ý với các điều khoản và điều kiện của trang web.

PLACE ORDER

Figure 82: Payment (Source: Authors)

THANK YOU FOR YOUR PURCHASING!

You have 15 minutes to complete process

Scan me: QUANG ANH TRUNG
1882 888 029 11

BILLING

| Subtotal | 720.000đ |
|--------------|-----------------|
| Discount | 0đ |
| Total | 720.000đ |

PAYMENT PROCESS

Processing →

LATEST POST

- Pocket These Quick Tips for Cleaning Your Ear Piercings Without Worrying About Bumps**
- How to Treat Ear Piercing Bumps at Home?**
- Where is it safe to pierce?**
- Troubled Piercings? Rebound Piercing Offers Expert Solutions for All Your Needs!**

REBOUND ARTICLES

LATEST POST

- Pocket These Quick Tips for Cleaning Your Ear Piercings Without Worrying About Bumps**
- Where is it safe to pierce?**
- Troubled Piercings? Rebound Piercing Offers Expert Solutions for All Your Needs!**
- How to Treat Ear Piercing Bumps at Home**

Figure 83: Blog (Source: Authors)

REBOUND ARTICLES

LATEST POST

- Pocket These Quick Tips for Cleaning Your Ear Piercings Without Worrying About Bumps**
- Where is it safe to pierce?**
- Troubled Piercings? Rebound Piercing Offers Expert Solutions for All Your Needs!**
- How to Treat Ear Piercing Bumps at Home**

PIERCING SERVICES

The Proper Ear Piercing Aftercare Routine

Proper ear piercing aftercare significantly impacts the healing time of your piercing. If you take meticulous care, your piercing will heal quickly and minimize the risk of infection or bumps. One of the most effective ways to prevent complications is to keep your piercing clean. For a clean piercing, avoid touching your piercing if the issue is piercing bumps, the article will provide you with a gentle solution, eliminating all hairs and satisfying your passion.

The ear piercing cleaning aftercare process will proceed in three basic steps:

- Step 1: Use a cotton swab and saline solution to thoroughly clean the earring end and the area around the piercings.
- Step 2: Apply red antibiotic solution for additional disinfection for the first 2 to 3 days after piercing.
- Step 3: Wipe again with clean water, which can be regular drinking water or mineral water.

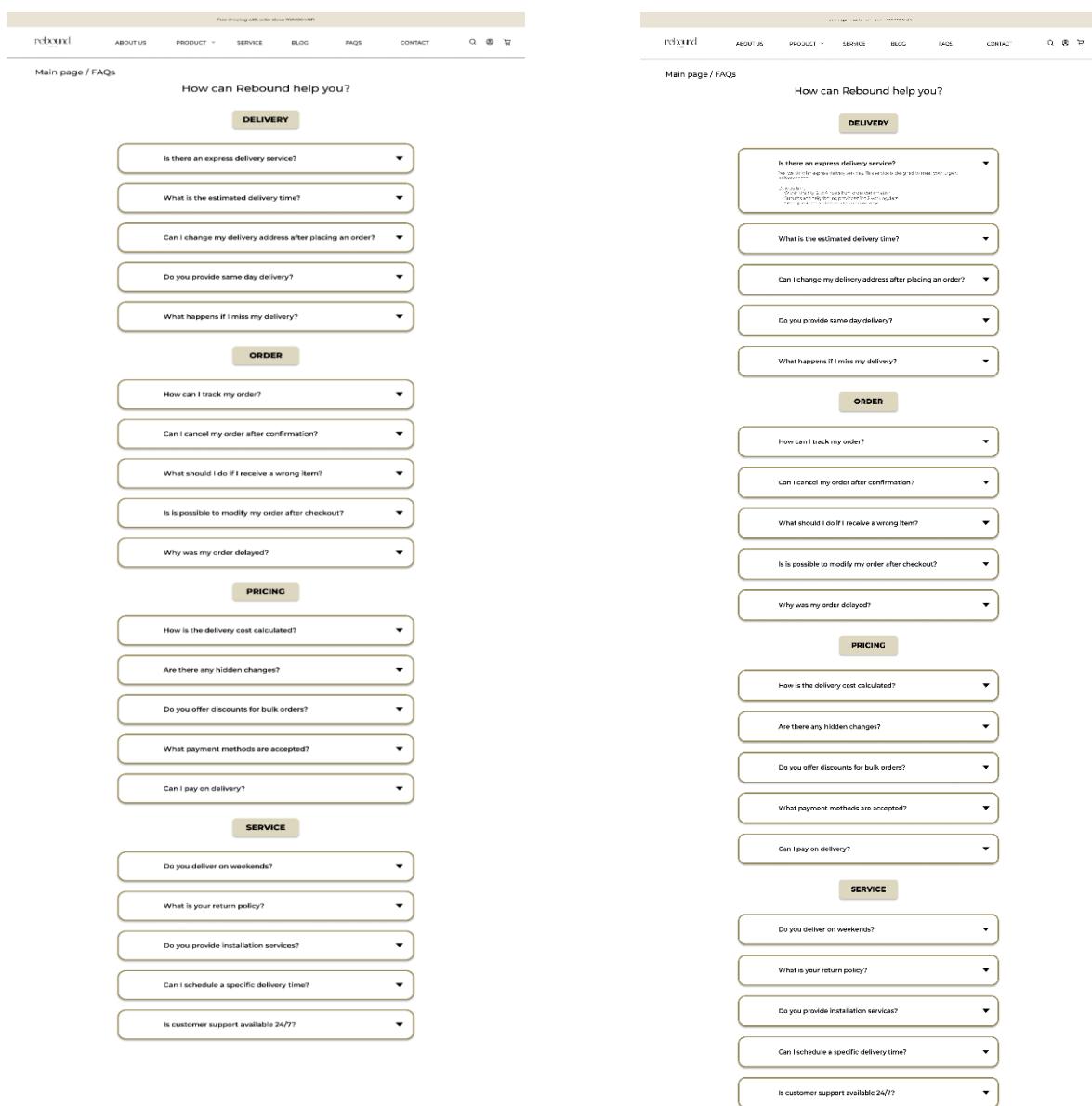


Figure 84: FAQs (Source: Authors)

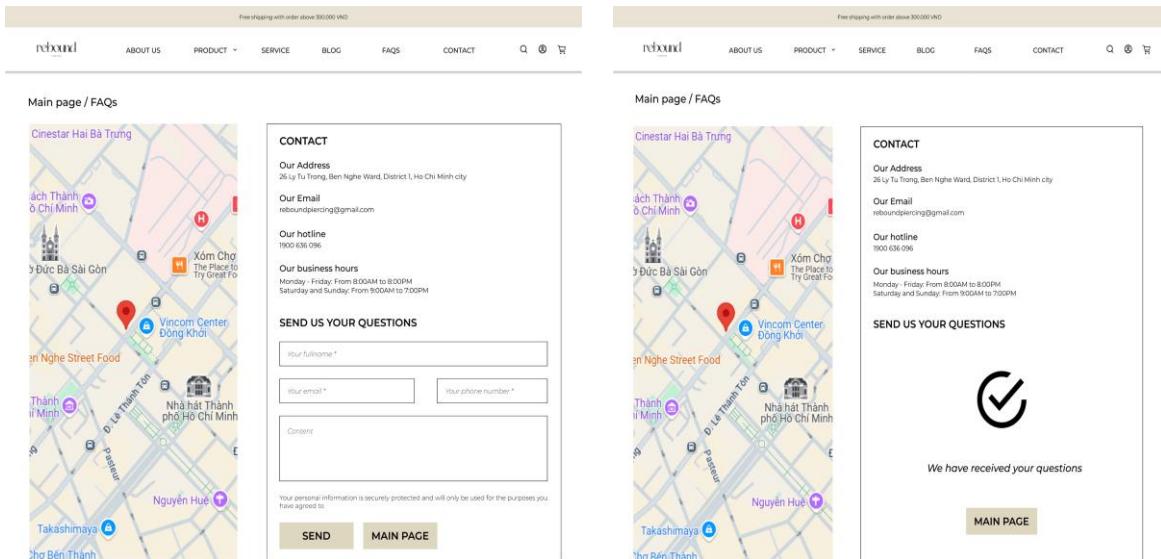


Figure 85: Contact Page (Source: Authors)

4.6.2. Mock-up for Admin

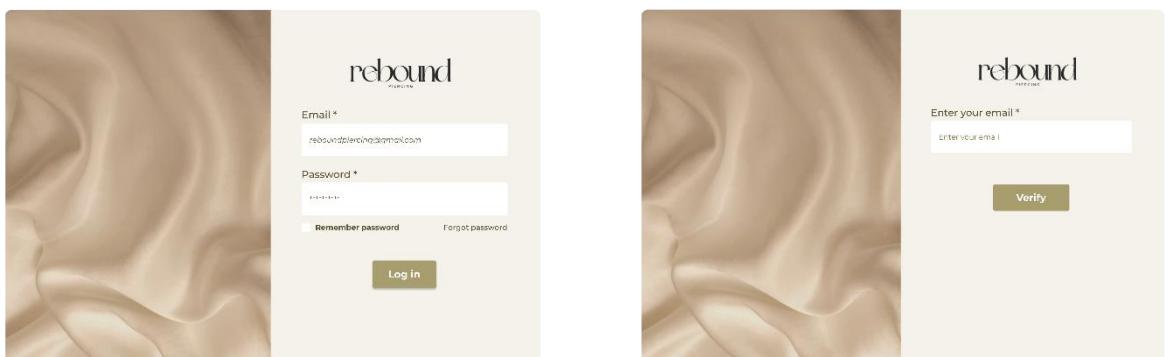


Figure 86: Admin Login (Source: Authors)

Figure 87: Admin Forgot Password (Source: Authors)

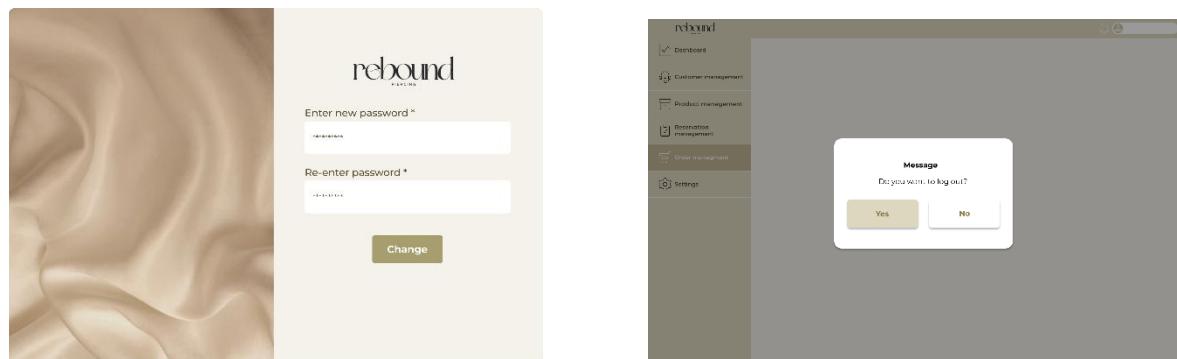


Figure 88: Admin Reset Password (Source: Authors)

Figure 89: Admin Logout (Source: Authors)

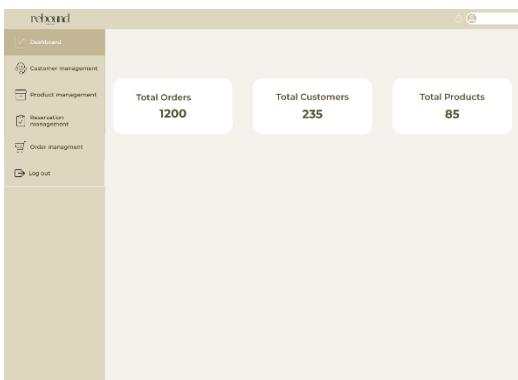


Figure 90: Admin Homepage (Source: Authors)

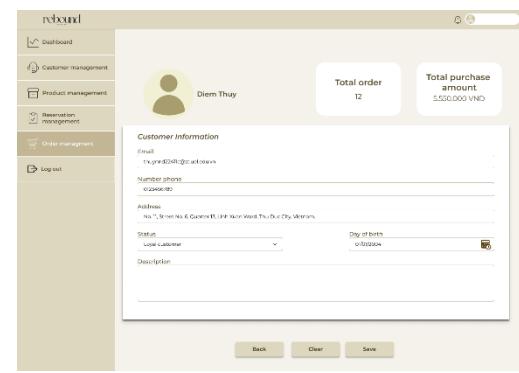


Figure 91: Admin Edit Customer (Source: Authors)

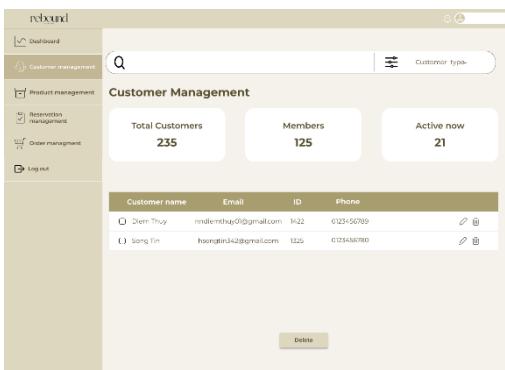


Figure 92: Admin Customer Management (Source: Authors)

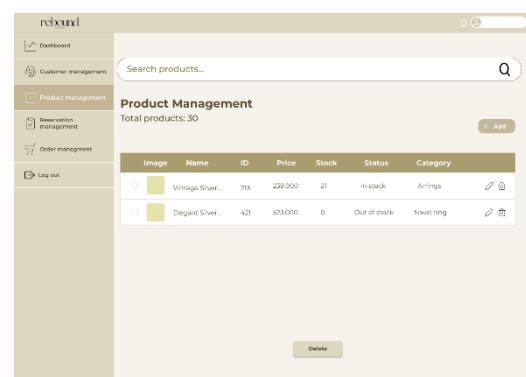


Figure 93: Admin Product Management (Source: Authors)

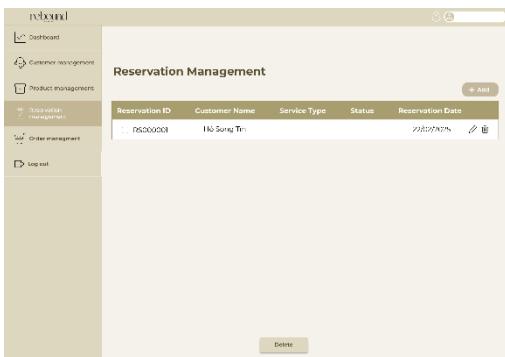


Figure 94: Admin Management Reservation (Source: Authors)

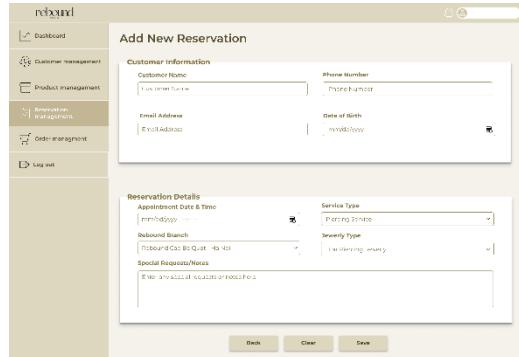


Figure 95: Admin Add Reservation (Source: Authors)



Figure 96: Admin Reservation Details (Source: Authors)

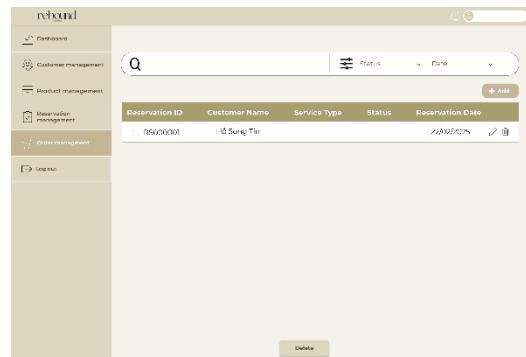


Figure 97: Admin Order Management (Source: Authors)

Figure 98: Admin Add Product (Source: Authors)

Figure 99: Admin Add Order (Source: Authors)

Figure 100: Admin Order Details (Source: Authors)

Figure 101: Admin Edit Product (Source: Authors)

CHAPTER 5: CONCLUSION

5.1. Result

The Rebound Piercing website is designed to provide a seamless and elegant digital experience for both customers and administrators, leveraging a robust technology stack that ensures efficiency, scalability, and user-friendliness. The front-end is developed using Angular, HTML, CSS, JavaScript, and Bootstrap, creating a responsive and visually appealing interface. On the backend, Node.js powers the system, ensuring fast and scalable server-side operations, while MongoDB, a NoSQL database, efficiently manages product data, customer information, and appointments. The development process is further supported by tools such as Figma for UI/UX design, Draw.io for system modeling, GitHub for version control, and VS Code as the primary development environment. Additionally, a QR code payment system is integrated to provide a fast payment process.

5.1.1. Client Feature

The client-side of the Rebound Piercing website is designed to offer a premium shopping and service experience. Customers can easily explore Rebound Piercing's collection of high-quality jewelry and piercing services, with an intuitive browsing and filtering system to help them find their desired products quickly. The integrated appointment booking system allows users to schedule piercing sessions effortlessly, ensuring convenience and streamlined service management.

A secure user account system enables customers to register, log in, and manage their profiles, including tracking order history and viewing appointment details. The platform also includes an aftercare guide to provide customers with essential post-piercing care instructions, ensuring safety and satisfaction.

To further enhance the customer journey, the website features a blog section with insights into piercing trends, safety tips, and styling recommendations. The e-commerce system supports a seamless checkout process with QR code payment integration, making transactions quick and secure. The minimalist and premium UI/UX design, built using Bootstrap for responsiveness, ensures an engaging experience across desktop and mobile devices.

5.1.2. Admin Page

The admin panel is designed to optimize business operations by providing comprehensive management tools. It features a real-time dashboard that displays key business metrics such as total sales, customer activity, and scheduled appointments, helping administrators make data-driven decisions.

The product and inventory management system allows admins to add, edit, or remove products while tracking stock levels to ensure optimal availability. Additionally, the order and appointment management system enables staff to confirm, reschedule, or cancel bookings while maintaining seamless communication with customers.

The customer management feature provides administrators with the ability to handle user inquiries, update customer details, and oversee order fulfillment. A role-

based staff management system ensures secure access control, granting different team members permissions based on their responsibilities. With performance monitoring and security protocols in place, the admin panel ensures smooth operations while protecting sensitive user data. The combination of advanced technology and a well-structured system allows for future scalability, ensuring that the platform can grow alongside the business. By integrating a user-friendly e-commerce system, real-time appointment booking, and an efficient admin dashboard, the Rebound Piercing website successfully bridges the gap between premium service and digital convenience, solidifying its position as a leading brand in the piercing industry.

5.2. Limit

Although the Rebound Piercing website successfully meets initial requirements and core functionalities, there are still several limitations that need to be addressed in future development phases. Due to time constraints, certain advanced features could not be fully implemented or optimized as intended. Our main focus was ensuring a stable system for both clients and administrators, which led to postponing additional enhancements that could further improve the user experience.

One key limitation is the lack of a product filtering system, making it difficult for users to sort products based on categories, price range, or materials. A product customization feature was also planned, allowing customers to personalize jewelry pieces, but this has yet to be developed. Additionally, our system currently does not support automated refunds, rescheduling, or cancellations, requiring customers to manually contact support for these requests. This adds extra steps to the process, which we aim to streamline in future updates. Another missing feature is live chat support, which would provide instant assistance to customers, improving communication and response times. Similarly, the website does not yet have an integrated promotions or advertising system, limiting our ability to offer discount campaigns and promotional deals directly through the platform. Lastly, a product review section is yet to be implemented, preventing customers from sharing their feedback and experiences with purchased items.

Beyond these functional limitations, the website is designed primarily for desktop use, which may affect user experience on smaller screens. While mobile responsiveness was not a priority for this phase, future updates could consider optimizing the interface for a wider range of devices. Additionally, the platform currently offers limited payment options, as transactions are processed via QR code and bank transfer, which may not be ideal for all customers. Expanding payment methods to include credit cards, e-wallets, or installment options could improve accessibility and convenience. Another challenge lies in inventory forecasting and stock management. At present, the system does not include automated inventory tracking or predictive analytics, making it harder to anticipate demand fluctuations and restock accordingly. Implementing an advanced inventory management feature in future updates would help streamline stock control and prevent potential supply shortages.

Moving forward, we plan to develop these missing functionalities to enhance the website's overall usability and user satisfaction. Implementing a track order page will allow customers to monitor their purchases in real time, while a favorites feature will enable users to save items for later. We are committed to refining and expanding these features to create a more seamless and engaging shopping experience for Rebound Piercing customers.

5.3. Development

Taking into account the current limitations and the need for future enhancements, our development efforts for the Rebound Piercing website will focus on improving user experience, streamlining administrative processes, and expanding overall functionality.

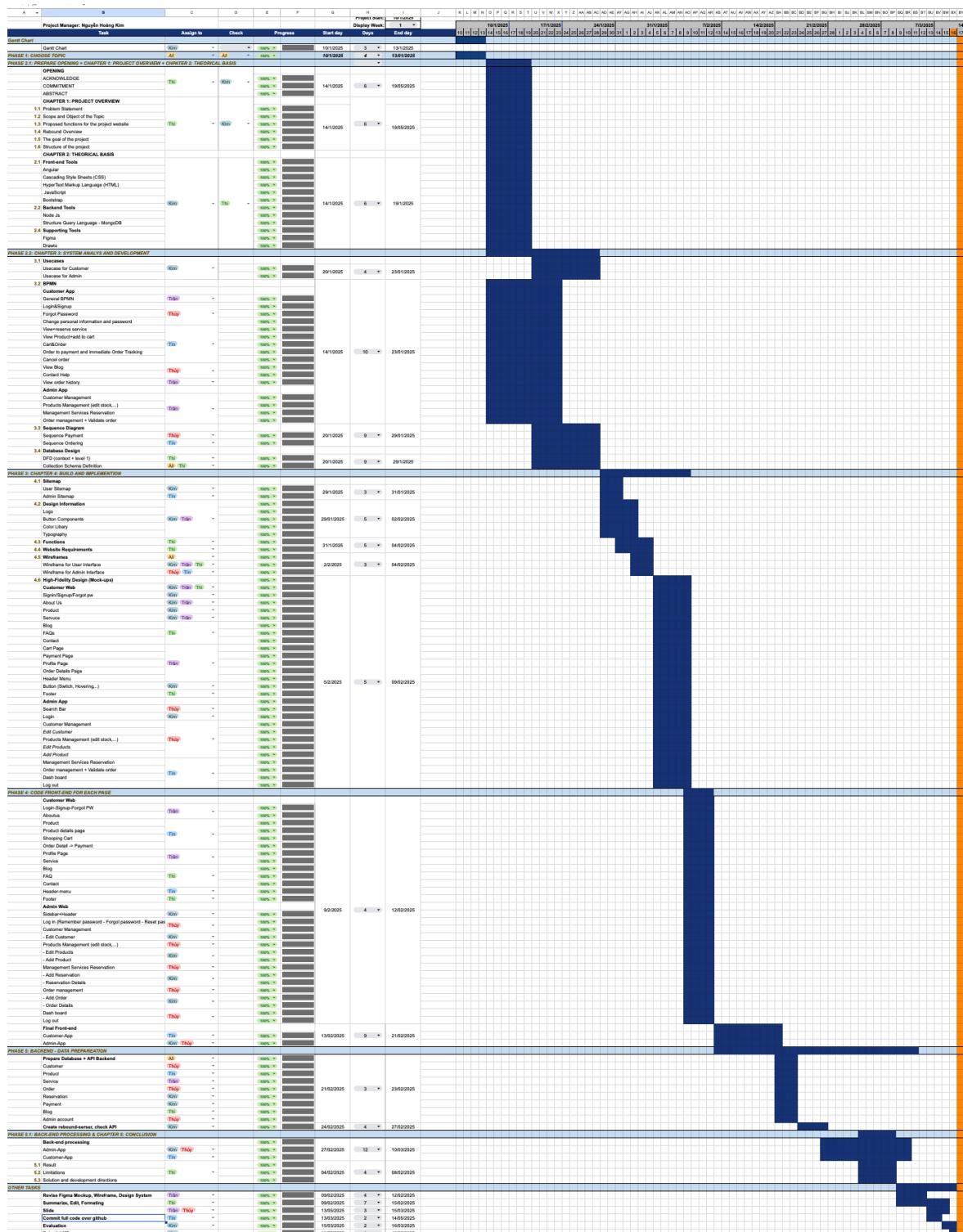
One of the key priorities is implementing a product filtering system, allowing customers to sort products by categories, materials, and price ranges. This will enhance the browsing experience, enabling users to find their desired products more efficiently. Additionally, we aim to integrate a product customization feature that lets customers personalize their jewelry pieces before purchasing. To streamline order

management, we will introduce automated refunds, rescheduling, and cancellation options. Currently, customers must contact support for these services, which can be time-consuming. By integrating a self-service feature, users will have greater flexibility while reducing the workload on customer service representatives. Another critical area for development is customer engagement and support. We plan to implement live chat support for real-time assistance and integrate a product review section where customers can share feedback, fostering trust and brand credibility.

In terms of marketing and promotions, we will incorporate discount campaigns and promotional banners using Bootstrap for visually appealing layouts and MongoDB to store promotional data. This will enable time-limited sales and exclusive offers, encouraging customer engagement. Furthermore, the website will include a track order feature, providing real-time updates on order status from purchase to delivery. This will be implemented with Node.js for order processing and MongoDB for tracking information, ensuring smooth communication between the system and the customer. On the administrative side, we plan to enhance the admin dashboard with inventory forecasting tools using MongoDB aggregation to analyze sales trends and predict product demand, helping prevent stock shortages. Additionally, we will diversify payment options by integrating banking APIs for direct transfers and alternative digital payment solutions, such as e-wallets, alongside the existing QR code payment system.

By addressing these development areas, we aim to create a more efficient, user-friendly, and engaging platform for both customers and administrators, ultimately enhancing the overall shopping experience on Rebound Piercing's website.

GANTT CHART



APPENDIX

Appendix 1. The Source Code Of The Project Is Posted On Github

https://github.com/kimnh04/REBOUND-GROUP5?fbclid=IwY2xjawJDy4JleHRuA2FlbQIxMAABHQ8ypFuCI7ER0OBy-EJQAO-R7SXZ37aH_4yn6sHjrwjwBEFR1CsIGhILmQ_aem_UNBNANIXAStElhi7N3UhKQ

Appendix 2. Design Of Wireframes And Mock-Ups Of Websites

<https://www.figma.com/design/YzF2PCbmUUKG3qeTDZrEgV/REBOUND?node-id=11-19&p=f&t=yZxKI5mUcLQiGyBE-0>

Appendix 3. Diagram For Project

https://drive.google.com/file/d/1I2H_LPth_T8O0SL6FYDNRJ8q5DhsVtc2/view?usp=sharing

Appendix 4. Video Running Website

https://drive.google.com/drive/u/2/folders/0AFB2txle6YPsUk9PVA?fbclid=IwY2xjawJD0nJleHRuA2FlbQIxMAABHSut6eqMmLitYHpx4w15u8JaIyp5xTQEdAq79oarMjGHwJXUl4zJ6363PA_aem_e3IR4R71Yjg1XnjMJfdCYw

Appendix 5. Project Implementation Plan (Gantt Chart)

https://docs.google.com/spreadsheets/d/1ceU3u5pnffv_MntQbtm-m9BKw_jn9f6V-j9Md5J8ZA4/edit?fbclid=IwY2xjawJD0F1leHRuA2FlbQIxMAABHb1Rp1s5f2AAMQ-qCjtekESAeW_2ihOdnpv_Au7Dv2SBowtxq-vvWQu-WA_aem_9m6iKrbvESGhbKbkVyxziQ&gid=0#gid=0

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