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# Tradicare: Sales Management and Appointment Booking System for Traditional Treatment

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**Abstract**

In the digital era, small businesses like Tradicare, a traditional treatment center in Pekan Parit Sikom, Johor, struggle with manual operations for appointments and sales, limiting growth. This project develops a web-based Sales Management and Appointment Booking System using Agile methodology and technologies like HTML, CSS, JavaScript, PHP, and MySQL. Key features include registration, product catalog, appointment scheduling, secure payments, and reporting. The system ensures efficiency through database normalization, real-time data handling, and encryption for security. Customers benefit from easy browsing, booking, and payments, while Tradicare gains automation, reduced errors, and analytics for decision-making. Modernizing operations helps expand market reach, improve customer satisfaction, and stay competitive. Future enhancements may include AI-driven health recommendations for personalized care.

## 1. Introductions

In today's globalized world, digital technology has become indispensable, transforming both personal and professional activities. Digital transformation (DT) enables firms to gain competitive advantages in dynamic markets [1], with many organizations reporting improved performance and productivity [2]. However, small businesses like Tradicare often lag in adopting these technologies. A 2020 survey revealed only 56% of small businesses had websites [3], despite Malaysians spending six hours online daily [4]. This gap highlights a missed opportunity for traditional businesses to expand their reach and modernize operations.

Tradicare, a traditional treatment center in Johor, exemplifies this challenge. Specializing in herbal remedies, it relies on manual booking and offline sales, limiting its growth potential. Modern consumers expect instant access to services [4], yet Tradicare's lack of digital tools creates inefficiencies and restricts its customer base. To address this, the project aims to develop a Sales Management and Appointment Booking System, streamlining operations and enhancing accessibility. The system will integrate e-commerce and online scheduling, eliminating barriers posed by traditional methods [3].

The project's objectives focus on designing, developing, and testing a web-based system for Tradicare. Key features include product catalogs, appointment scheduling, payment processing, and analytics. By automating these processes, the system reduces administrative errors and wait times while improving user experience. Additionally, it aligns with market trends, where digital platforms are crucial for business success [4]. The scope covers end-to-end functionality, ensuring Tradicare can manage sales, appointments, and customer data efficiently.

The system offers significant advantages. Customers gain 24/7 access to services, detailed product information, and seamless booking, enhancing convenience and satisfaction. For Tradicare, automation reduces

workload, improves accuracy, and provides actionable insights through analytics. The online presence also expands market reach, attracting tech-savvy consumers and positioning the business competitively [3]. These benefits collectively drive operational efficiency and long-term growth, bridging the gap between traditional practices and modern expectations.

In conclusion, this project underscores the transformative power of digital tools for traditional businesses. By adopting the proposed system, Tradicare can modernize its operations, improve customer engagement, and secure sustainability in a digital economy [3]. The expected outcomes enhanced efficiency, broader reach, and data-driven decisions highlight the system's potential to revolutionize Tradicare's business model while preserving its core values [4].

## 2. Literature Review

This review explores the challenges traditional treatment centers face in adopting modern technologies, emphasizing the transition from manual to digital systems for improved efficiency and customer satisfaction. Insights from similar systems underline the importance of features like real-time analytics, secure payment processing, and user-friendly interfaces to enhance operational efficiency while maintaining the authenticity of traditional practices[5].

### 2.1 Tradicare Sales Management and Appointment Booking System

Tradicare is a leading traditional care center in Pekan Parit Sikom, Pontian, Johor, specializing in holistic treatments for bone fractures and muscle fatigue. It combines traditional medicine with modern approaches, using organic herbal products and supplements to provide personalized, natural healing solutions [6].

**Fig. 1:** *Ahmad Syukri, Owner of Tradicare*

As shown in Fig. 1, owner Ahmad Syukri relies on manual processes for appointments and records, leading to scheduling conflicts, booking difficulties, and inventory inaccuracies. These inefficiencies limit growth and reduce customer satisfaction in an increasingly digital market [7]. The new Sales Management and Appointment Booking System will feature online booking, secure registration, and real-time inventory tracking. Automation will improve efficiency, reduce errors, and enhance convenience for both customers and staff [8]. This digital transformation will help Tradicare expand its reach, improve service accessibility, and streamline operations while maintaining its commitment to quality holistic care in a competitive industry [9].

### 2.2 Method and Technology

Tradicare's system utilizes Agile methodology [10] for iterative development, enabling continuous refinement of features like inventory tracking and automated scheduling. This approach ensures the system meets operational needs while allowing future enhancements.

Web technologies form the system's foundation, integrating sales and appointment management. Front-end tools (HTML, CSS, JavaScript) create responsive interfaces, while back-end frameworks (PHP, Python) handle payments and analytics [10]. MySQL manages data storage, with encryption ensuring security. This combination delivers a scalable, user-friendly platform for digital healthcare services.

#### 2.2.1 Sales Management System

The Sales Management System plays a crucial role in optimizing the sale of products and services at Tradicare. By leveraging advanced digital tools, this system provides a centralized platform for recording sales transactions, managing inventories, and generating detailed reports[11]. Through automation, the system ensures the seamless tracking of product availability and sales data, which significantly minimizes the likelihood of errors associated with manual processes.Furthermore, the system’s reporting capabilities offer valuable insights into sales performance and customer preferences, empowering the management team to make data-driven decisions that align with business objectives.

### 2.2.2 Appointment Booking System

The Appointment Booking System transforms scheduling by enabling customers to book treatments online anytime, eliminating error-prone manual methods [12]. This automation streamlines workflows, reduces administrative tasks, and improves accuracy. Customers can conveniently select timeslots, view services, and access treatment details for informed decisions.

For administrators, the system provides efficient appointment management tools, optimizing time and resources. Automated reminders minimize missed appointments, while real-time updates ensure transparency, building trust and encouraging repeat usage.

### 2.2.3 Web-based Technology

The web-based nature of the system ensures accessibility and scalability, providing Tradicare with a competitive edge in today's digital marketplace. Built using robust technologies like HTML, CSS, JavaScript, PHP, and MySQL, the system offers a responsive, interactive, and secure platform[13]. Real-time data handling through AJAX ensures smooth user experiences, whether for browsing products or scheduling appointments. This technology also supports scalability, allowing the system to handle increased user activity and adapt to future needs[14]. The web-based design ensures that customers can interact with the system across various devices, enhancing accessibility and aligning with modern user expectations.

## 2.3 Study of Existing Related Systems

The proposed system combines the best features of Renyitang, Gaia Herbs, and Teratak Spa to create an efficient digital platform for Tradicare. Drawing from Renyitang, it offers seamless appointment booking with real-time scheduling and practitioner profiles. The product catalog, inspired by Gaia Herbs, provides detailed descriptions and inventory tracking, while Teratak Spa's influence ensures personalized accounts, automated notifications, and secure payment processing.

By merging these functionalities, Tradicare gains a modern, all-in-one solution that simplifies operations and enhances customer experience. The integrated system improves accessibility, efficiency, and transparency which is helping the business expand its reach while maintaining its traditional care values. Future upgrades could include AI-driven recommendations for even greater personalization.

**Table 1** *System Comparison*

| Features/System | Renyitang TCM | Gaia Herbs | Teratak Spa | Tradicare |
|---|---|---|---|---|
| Log In and User Management | √ | √ | √ | √ |
| Product Catalog | X | √ | X | √ |
| Real-Time Tracking | √ | √ | √ | √ |
| Notifications | √ | X | √ | √ |
| Booking Appointment | √ | X | √ | √ |
| Payment Management | √ | √ | √ | √ |

As shown in Table 1, Tradicare combines the best features of existing systems into one platform, including user management, product catalog, real-time tracking, notifications, and secure payments. This integration creates a seamless, user-friendly experience for appointments, product access, and sales management, surpassing current systems[15].

## 3. Methodology

The Sales Management and Appointment Booking System for Tradicare is developed using the Agile SDLC model, chosen for its flexibility and iterative approach. This methodology allows for continuous refinement through manageable development cycles, each focusing on key components like user accounts, sales management, and appointment scheduling. Regular stakeholder feedback ensures the system aligns with both operational needs and user expectations throughout the development process.

The Agile approach enables seamless integration of improvements during development, reducing risks and enhancing system quality. For instance, real user feedback helps refine key modules like booking and product catalog, optimizing features such as secure payments and real-time inventory [16]. Agile's collaborative nature also ensures close coordination between developers and stakeholders, helping address challenges effectively while aligning with Tradicare's goals of operational efficiency and customer engagement [17].

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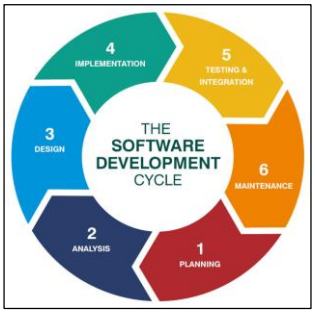



**Fig. 2** *Agile Methodology*

Fig. 2 shows the essential stages of Agile development starting with planning to define goals and scope followed by analysis to collect requirements. The design phase converts these into technical plans while implementation builds the system components. Testing verifies functionality and maintenance incorporates user feedback for improvements with each iterative phase carefully designed to address user needs and enhance the system for successful project delivery.

**Table 2** *Functional Requirements*

| Phase | Task | Output |
|---|---|---|
| Planning | • Define system objectives and scope with stakeholders.<br>• Conduct feasibility study to assess viability (technical, financial, operational).<br>• Develop a detailed project timeline, budget, and resource allocation.<br>• Prioritize features such as appointment booking, sales tracking, and customer management. | • Project proposal<br>• Feasibility report<br>• Project roadmap and Gantt chart<br>• List of functionalities |
| Analysis | • Gather user requirements through interviews, surveys, and meetings.<br>• Analyze current workflows and identify system gaps.<br>• Categorize requirements into functional and non-functional aspects. | • Requirements specification document<br>• Gap analysis report<br>• Functional and non-functional requirements |
| Design | • Develop system architecture to define components, interactions, and data flow.<br>• Create database schemas<br>• Develop UI wireframes and prototypes for user interface.<br>• Obtain stakeholder feedback on prototypes. | • System architecture diagram<br>• Database schema<br>• UX/UI design mockups<br>• Refined UI prototypes |
| Implementation | • Code and integrate system components (back-end, front-end, database).<br>• Perform continuous integration with regular testing during sprints.<br>• Conduct code reviews and resolve technical challenges as they arise. | • Developed system modules<br>• Working codebase with version control<br>• Documented code reviews and resolutions |
| Testing and Integration | • Conduct unit tests on individual components.<br>• Perform integration and system testing to ensure seamless functionality.<br>• Conduct User Acceptance Testing (UAT) to gather feedback from end-users. | • Testing results for individual components<br>• Integration testing report<br>• UAT feedback and improvements log |

**Table 2**: (cont.)

| Phase | Task | Output |
|---|---|---|
| | ● Fix identified bugs and optimize for performance. | ● Improved system performance |
| Maintenance and Continuous Improvement | ● Deploy the functional system for end-user access.<br>● Gather user feedback and implement continuous improvements through Agile cycles.<br>● Perform regular system audits and updates to ensure sustainability. | ● Web system accessible to users<br>● Updated system.<br>● Maintenance and upgrade reports |

Table 2 demonstrates how the structured, yet flexible system workflow enables effective development of Tradicare's solution. The iterative approach ensures clear goals, organized execution, and seamless phase transitions while minimizing risks of misalignment. This methodology promotes collaboration and delivers a reliable, scalable system that meets both user needs and operational objectives.

## 4. System Analysis and Design

The analysis and design phase transforms user needs into a functional system. Analysis clarifies requirements, while design creates detailed blueprints for architecture, data, interfaces, and workflows. This foundation ensures efficient implementation and minimizes risks

### 4.1 Functional and Non-Functional Requirement

This section details Tradicare's system requirements, covering both functional and non-functional aspects. As shown in Table 3, the functional requirements specify core features for managing appointments, product sales, and user data [18], organized into modules like user registration, booking, and reporting. These ensure the system meets operational needs while delivering essential services.

**Table 3** *Functional Requirements*

| No | Module | Description |
|---|---|---|
| 1. | Registration and Login Module | ● Allow the new users to register new account before login.<br>● Allow the existing users to login with the id and password.<br>● Redirect the valid users to dashboard when successful login. |
| 2. | Product Catalog and Availability | ● Display detailed product descriptions, including ingredients and pricing.<br>● Allow customers to check product availability in real-time.<br>● Enable users to search and filter products based on categories or health concerns. |
| 3. | Booking Appointment Module | ● Allow customers to schedule appointments with masseuse.<br>● Enable customers to view and modify their bookings based on availability.<br>● Notify both customers and service providers about scheduled appointments. |
| 4. | Payment Module | ● Allow customers to securely pay for products or services through various payment methods.<br>● Generate payment receipts automatically after successful transactions. |
| 5. | User Management Module | ● Enable administrators to manage user accounts, including customer details and account status.<br>● Allow users to update their profile information. |
| 6. | Report Module | ● Generate reports on product sales, appointment bookings, and user activity.<br>● Provide insights for business performance analysis and decision-making. |

The non-functional requirements as shown at Table 4 specify the quality attributes of the system, including performance, usability, security, and scalability, ensuring the system operates effectively under varying conditions while providing a user-friendly and secure experience[19]. Together, these requirements form the foundation for designing and developing a system that addresses the current inefficiencies in manual operations and enhances customer satisfaction.

**Table 4** *Non-functional Requirements*

| No | Requirement | Description |
|---|---|---|
| 1 | Performance | ● The system should always be accessible with a response time under 1 second for key functions. |
| 2 | Scalability | ● The system must handle up to 500 concurrent users without performance degradation. |
| 3 | Usability | ● The interface should follow user-friendly design principles for intuitive navigation. |
| 4 | Security | ● Ensure data encryption during transactions and secure user authentication. |
| 5 | Compatibility | ● The system must be compatible with major browsers (Chrome, Edge, Firefox). |
| 6 | Availability | ● The system should maintain an uptime of 99.9%, minimizing downtime and disruptions. |
| 7 | Maintainability | ● The system should allow for easy updates and maintenance without major disruptions to operations. |
| 8 | Operational | ● The loading time required for any webpage should not exceed 1 minute. |

The requirements for the system of Tradicare ensure it meets essential functionalities like user registration and appointment management while maintaining quality attributes such as security and scalability. Together, these functional and non-functional requirements provide a solid framework for building an efficient, user-friendly, and reliable platform that enhances operations and customer satisfaction.

## 4.2 System Analysis

The appendices provide essential documentation of the system's analysis. Appendix A (Context Diagram Tradicare) outlines the system's scope and actor interactions, Appendix B (Flowchart Diagram Tradicare) details the operational workflow, Appendix C (Data Flow Diagram - Level 0 Tradicare) illustrates how data moves through the system, and Appendix D (Entity Relationship Diagram Tradicare) defines the database structure and relationships between entities. Together, these appendices comprehensively describe the system's functionality, processes, and data management framework.

## 4.3 System Design

System design is crucial for transforming user requirements into an efficient, functional solution. This phase creates blueprints using context diagrams, data flow diagrams, ERDs, and flowcharts to visualize system structure and workflows, ensuring seamless component integration [20].

The design prioritizes user experience (UX) and accessibility, featuring intuitive interfaces, responsive layouts, and clear navigation for optimal usability across devices [21]. The design of the user interface (UI) guarantees that all functionalities are easily accessible to both administrators and customers, thereby reducing the learning curve and enhancing satisfaction[22]. Modular organization that including user registration, product catalog, booking, and payment systems will ensures efficient task completion. Prototyping and iterative feedback refine the design to align with user expectations.

Technical design focuses on scalability, security, and performance [23]. Database normalization prevents redundancy, while encryption and role-based access control (RBAC) safeguard data [24]. Secure coding practices and adaptable architecture ensure the system meets current needs and accommodates future enhancements, maintaining long-term relevance.

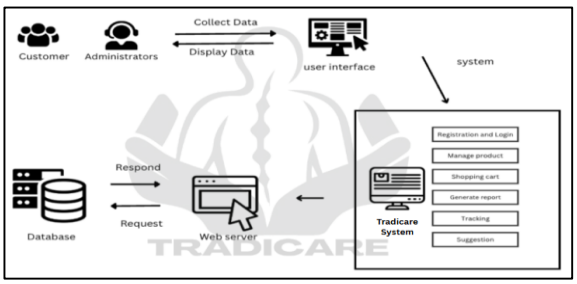



**Fig. 3** *System Architecture*

Fig. 3 presents Tradicare's system architecture, displaying the structured interaction between users (customers/administrators) and core modules like registration, product management, shopping cart, and reporting. The design ensures seamless data flow from frontend interfaces through the web server to the backend

database, maintaining security via role-based access control while supporting essential functions like data processing and analytics.

### 4.3.1 Relational Schema

The schema table as shown in Table 5 defines the database's structure, organizing tables, attributes, and relationships for efficient data management, integrity, and performance[25]. The data dictionary complements this by detailing each attribute's data type, size, purpose, and constraints, ensuring consistency, aiding developers, and supporting smooth implementation and maintenance[26].

**Table 5** *Relational Schema*

| No | Table Name | Attributes |
|---|---|---|
| 1 | User | user_id (PK), user_name, email, tel_number, user_role, password_hash, created_at, updated_at |
| 2 | Cart | cart_id (PK), user_id (FK), order_id (FK), status, created_at, updated_at |
| 3 | Product | product_id (PK), product_name, price, description, stock_quantity, category, product_image, created_at, updated_at |
| 4 | Cart_Item | cart_item_id (PK), cart_id (FK), product_id (FK), quantity, added_at, unit_price |
| 5 | Order | order_id (PK), user_id (FK), location_id (FK), order_date, total_amount, payment_status, shipping_address, status |
| 6 | Appointment | appointment_id (PK), user_id (FK), service_id (FK), available_time_id (FK), end_time, appointment_date, status, notes, created_at, updated_at |
| 7 | Service | service_id (PK), service_name, description, duration_minutes, price, active, deleted, created_at, updated_at |
| 8 | Payment | payment_id (PK), user_id (FK), order_id (FK), appointment_id (FK), amount, payment_date, payment_method, status, transaction_id, billcode, bill_reference, created_at, updated_at |
| 9 | Tracking | tracking_id (PK), order_id (FK), tracking_number |
| 10 | Location | location_id (PK), user_id (FK), location_name |
| 11 | Available _Time | available_time_id (PK), deleted, start_time, end_time, created_at, updated_at |
| 12 | Unavailable _Time | unavailable_time_id (PK), available_time_id (FK), date, deleted, created_at, updated_at |

The following table above are the tables from the database that have been designed and extracted from the entity relationship diagram. They were created using Microsoft SQL Server.

### 4.3.2 Interface Design

The user interface of Tradicare's system is designed to streamline workflows and enhance efficiency while catering to diverse user needs. Prioritizing simplicity and accessibility, it ensures even less tech-savvy users can navigate with ease.

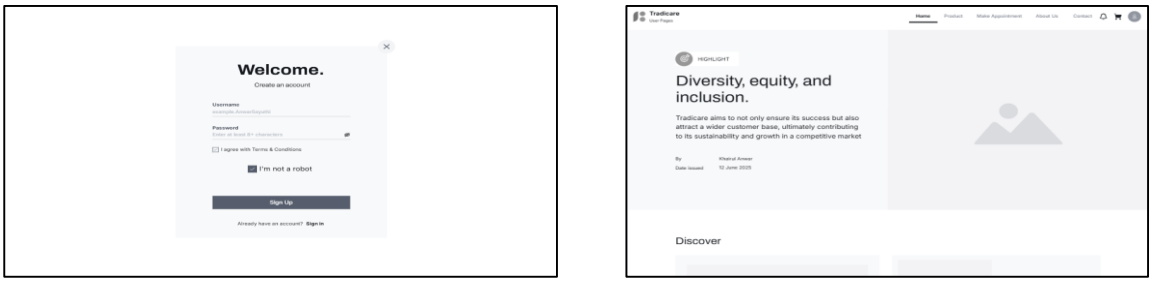



**Fig. 7 (a)** *User Register Interface* **(b)** *User Homepage Interface*

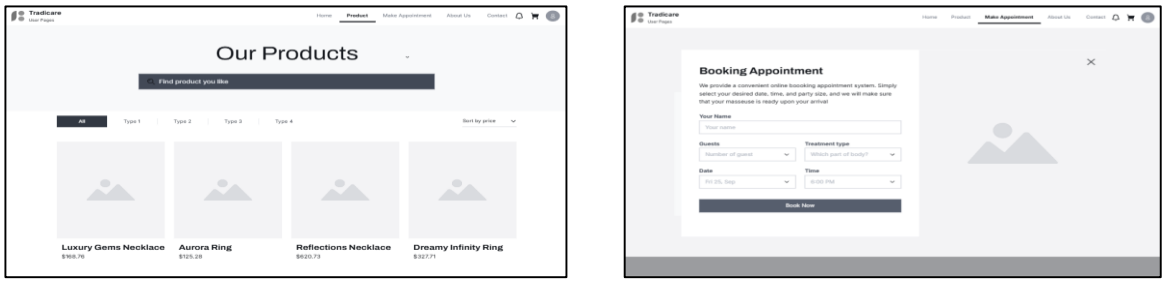



**Fig. 8 (a)** *User Product Listing Interface* **(b)** *User Booking Appointment Interface*

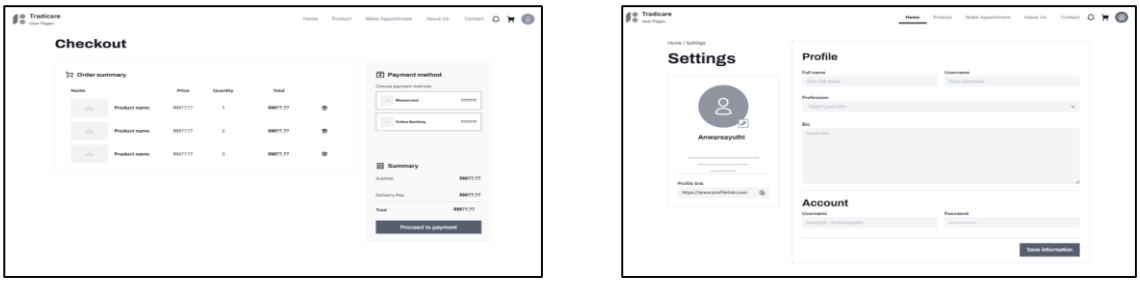



**Fig. 9 (a)** *User Cart Interface* **(b)** *User Account Setting Interface*

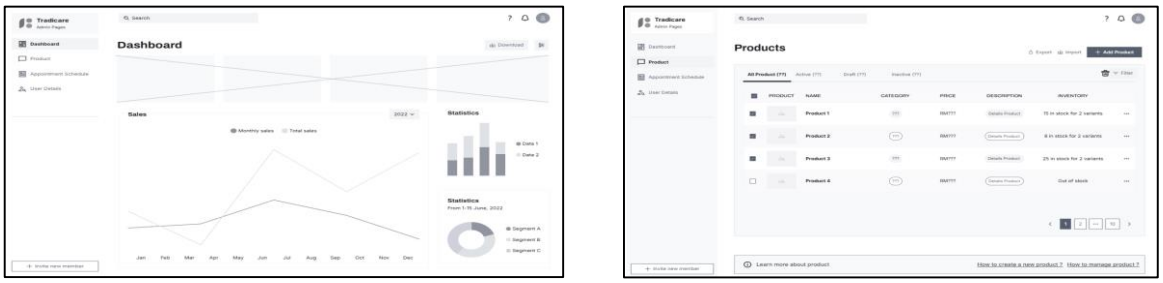



**Fig. 10 (a)** *Admin Dashboard Interface* **(b)** *Admin Product Management Interface*

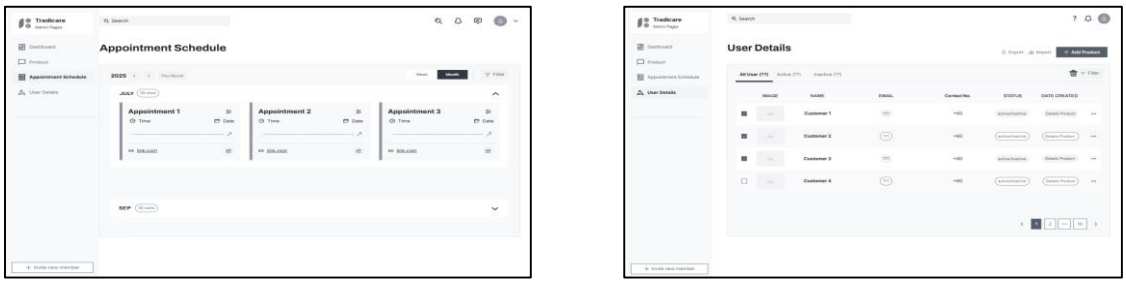



**Fig. 11 (a)** *Admin Appointment Schedule Interface* **(b)** *Admin Customer Details Interface*

The system interfaces (Fig. 7-11) ensure optimal usability which is Fig. 7(a-b) handle secure registration and homepage navigation. Fig. 8(a-b) enable product browsing with search/filters and appointment scheduling. Fig.

9(a-b) manage carts and account settings. Admin interfaces (Fig. 10(a-b) and 11(a-b)) provide dashboard analytics, product/appointment management, and customer oversight through calendar views and user tables. All designs prioritize intuitive navigation, efficient workflows, and role-specific functionality to enhance both customer experience and administrative control.

## 5. Implementation and Testing

This chapter details the implementation and testing of Tradicare's web-based Sales Management and Appointment Booking System. Developed using HTML, CSS, JavaScript, PHP, and MySQL, the platform enables user registration, product catalog management, appointment scheduling, and secure payments. Comprehensive testing (unit, integration, and UAT) verified system functionality, ensuring it meets all requirements while improving operational efficiency and user experience for traditional treatment centers.

### 5.1 System Implementation

The Tradicare system was developed using HTML/CSS/JavaScript for the responsive frontend and PHP/Laravel for secure backend operations, with MySQL managing data efficiently. Key features include real-time inventory, secure payments, appointment scheduling, and analytics dashboards. Following Agile methodology, the system underwent iterative development and testing before deployment via XAMPP, resulting in a scalable, user-friendly platform that supports Tradicare's digital transformation with enhanced operational efficiency.

#### 5.1.1 Account Registration and User Login Module

Fig. 12 presents the authentication system with components (a) and (b) showing secure server-side login and registration code implementing credential validation, role-based routing and password encryption, while (c) and (d) display user-friendly interfaces with clear form fields and validation feedback. The system effectively balances robust security measures like session management and role separation with optimal usability for seamless account access and creation.


**Fig. 12 (a)** *Login Code* **(b)** *Registration Code* **(c)** *Interface Login* **(d)** *Register Interface*

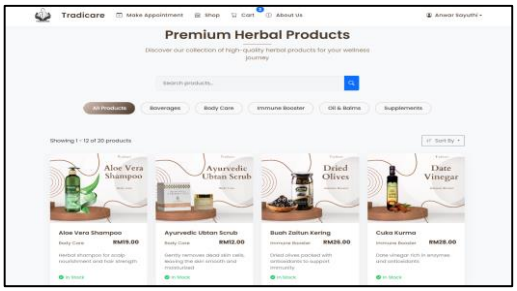
#### 5.1.2 Product Catalog and Availability Module

Fig. 13 presents the product management system components, including (a) customer-facing product logic for browsing/purchasing, (b) admin product management code for inventory control, (c) customer product interface with search/filter features, and (d) admin product dashboard for CRUD operations. The dual-section

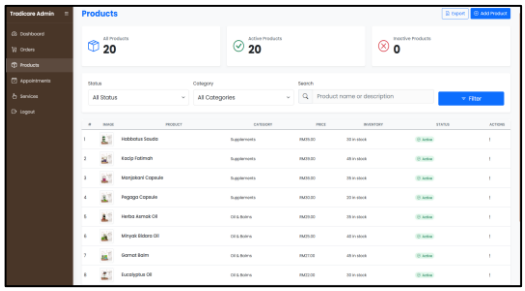
architecture separates customer shopping functionalities from backend administration while maintaining data consistency, with interfaces optimized for their respective user roles through tailored UIs and access controls.

**(a)**

**(b)**




**(c)**




**(d)**

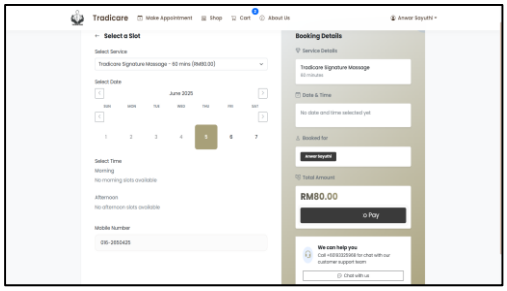
**Fig. 13 (a)** *Product Code(customer section)* **(b)** *Product Code(admin section)* **(c)** *Product Interface(customer section)* **(d)** *Product Interface(admin section)*

### 5.1.3 Booking Appointment Module

Fig. 14 displays the appointment system with (a) customer appointment retrieval code and (b) admin backend logic, plus (c) booking interface and (d) appointment management dashboard. This role-based solution securely simplifies user scheduling while empowering administrators with comprehensive oversight tools.

**(a)**

**(b)**

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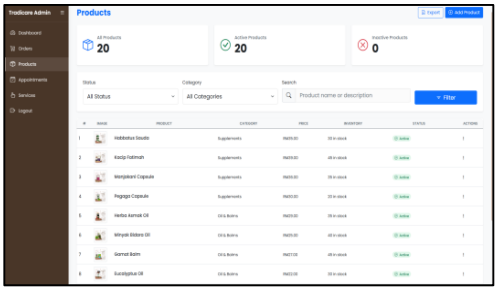
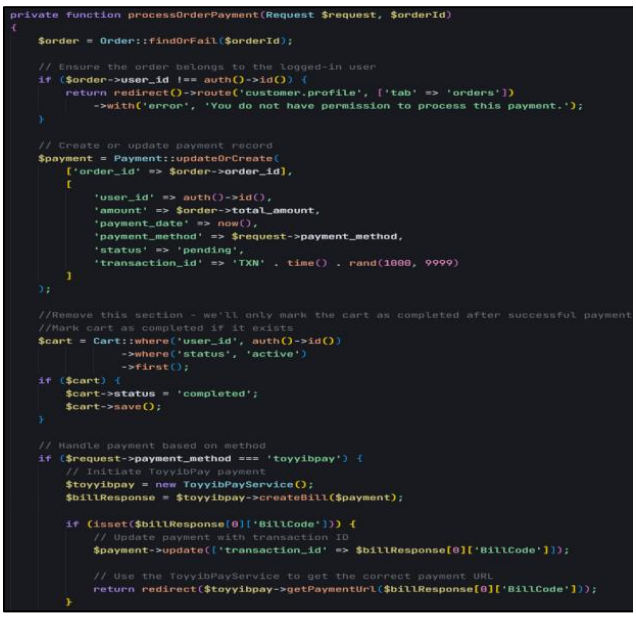



**(d)**

**Fig. 14 (a)** *Appointment Code(customer section)* **(b)** *Appointment Code(admin section)* **(c)** *Appointment Interface(customer section)* **(d)** *Appointment Interface(admin section)(continue)*

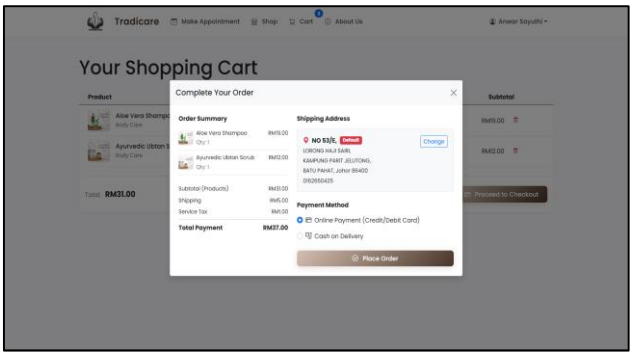
### 5.1.4 Payment Module

Fig. 15 illustrates the implementation and user interface of the payment system for both product ordering and appointment booking. Subfigure (a) shows the backend payment processing code for product orders, while subfigure (b) depicts the corresponding logic for appointment bookings. Subfigures (c) and (d) present the front-end payment interfaces for product orders and appointments respectively, enabling users to select payment methods and complete transactions securely and efficiently. These components collectively demonstrate the integration of payment functionality in different service modules of the system.



**(a)**

**(b)**

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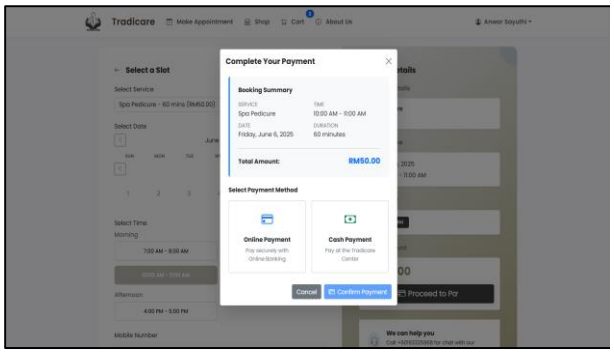
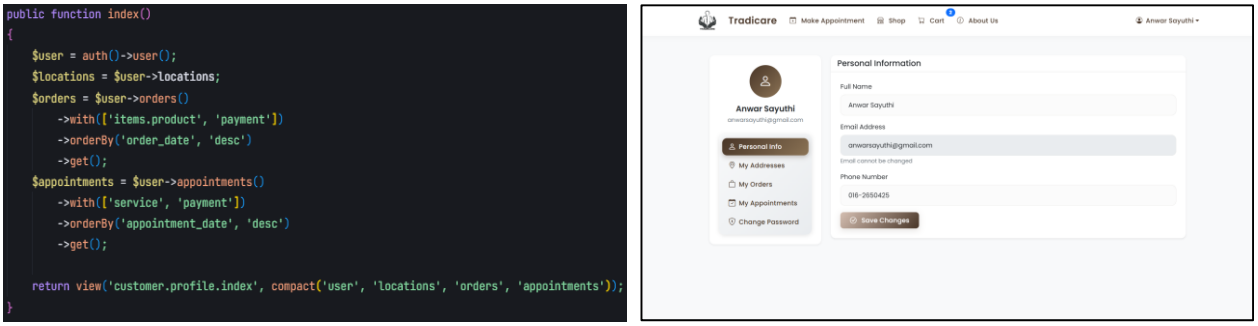



**(d)**

**Fig. 15 (a)** *Payment Code(product order section)* **(b)** *Payment Code(appointment booking section)* **(c)** *Payment Interface(product order section)* **(d)** *Payment Interface(appointment booking section)*

### 5.1.5 User Management Module

Fig. 16 presents the user profile management functionality of the system. Subfigure (a) displays the backend code responsible for retrieving and organizing user data, including locations, orders, and appointments, to be shown on the profile page. Subfigure (b) shows the front-end profile interface where users can view and update their personal information, such as name, email address, and phone number. This feature ensures users can manage their account details and access their order and appointment history efficiently.

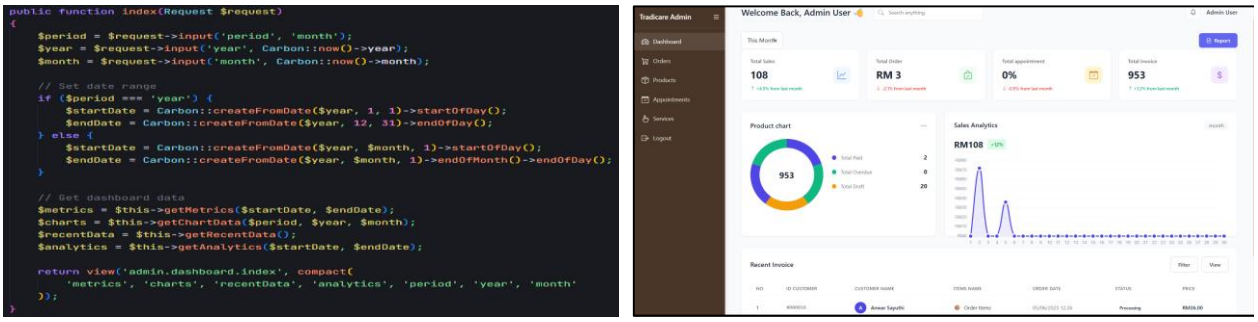



**(a)** **(b)**

**Fig. 16 (a)** *Profile Code* **(b)** *Profile Interface*

### 5.1.6 Report Generator Module

Fig. 17 showcases the admin dashboard functionality of the system. Subfigure (a) presents the backend code that processes date filters to retrieve analytics and metrics based on the selected period (year or month). Subfigure (b) illustrates the dashboard interface, which visually displays key data such as total users, revenue, product chart, sales analytics, and recent invoices. This feature provides administrators with a comprehensive overview of system performance and user activity for effective monitoring and decision-making.




**(a)** **(b)**

**Fig. 17 (a)** *Dashboard Code* **(b)** *Dashboard Interface*

## 5.2 System Testing

Testing is a crucial phase in system development, aimed that all functionalities operate as intended. Before the system is released to end-users, comprehensive testing is conducted to identify and eliminate any bugs or errors. In this project, both functional testing and user acceptance testing are performed to confirm that the system meets the specified requirements.

### 5.2.1 Account Registration and Login

Table 6 show the test case for Account Registration and Login module. There are total of 3 test case for this module. The purpose of this test is to verify whether the administrator is allowed to register for an account, login into the system, and whether the system will restrict login if an incorrect credentials is entered. Table 6 shows that all the three tests had passed the test.

**Table 6** *Test Case Results for Registration and Login Module*

| Module: Account Registration and Login | | | |
|---|---|---|---|
| **No.** | **Test Cases** | **Description** | **Outcome** |
| 1. | User registration | New users are able to register with valid information. | PASS |
| 2. | User login | Registered users can log in using correct credentials. | PASS |
| 3. | Dashboard redirect | System redirects to user dashboard after successful login. | PASS |

### 5.2.2 Product Catalog and Availability Module

Table 7 presents the test cases for the product catalog and availability module, validating three core functionalities. The tests confirm that the system correctly displays product details (names, descriptions, prices), enables search and filtering by category/health concerns, and provides real-time stock status updates. All test cases passed, ensuring seamless product browsing and accurate inventory visibility for users.

**Table 7** *Test Case Results for Product Catalog and Availability Module*

| Module: Product Catalog and Availability | | | |
|---|---|---|---|
| **No.** | **Test Cases** | **Description** | **Outcome** |
| 1. | Product listing | Displays product names, descriptions, and prices. | PASS |
| 2. | Search and filter | Allows users to search and filter products by category or health concern. | PASS |
| 3. | Real-time availability | Shows real-time stock status for all listed products. | PASS |

### 5.2.3 Booking Appointment Module

Table 8 shows the test cases for the booking appointment module, with all three tests passing successfully. The tests verify that customers can schedule bookings by selecting dates, times, and treatments, modify or cancel existing appointments, and receive automated notifications for booking confirmations and updates. This ensures the module functions seamlessly for both users and administrators.

**Table 8** *Test Case Results for Booking Appointment Module*

| Module: Booking Appointment | | | |
|---|---|---|---|
| **No.** | **Test Cases** | **Description** | **Outcome** |
| 1. | Schedule booking | Customers can choose date, time, and treatment for booking. | PASS |
| 2. | Modify appointment | Users can view and update or cancel existing bookings. | PASS |
| 3. | Notification system | System notifies user and admin about booking confirmation or updates. | PASS |

### 5.2.4 Payment Module

Table 9 shows the test cases for the payment module, verifying secure payment processing, automated receipt generation, and user confirmation. All three test cases includes payment processing via multiple methods, receipt generation, and payment confirmation are passed successfully, ensuring the module functions reliably for seamless transactions.

**Table 9** *Test Case Results for Payment Module*

| Module: Payment | | | |
|---|---|---|---|
| **No.** | **Test Cases** | **Description** | **Outcome** |
| 1. | Payment processing | Customers can make payments via multiple methods securely. | PASS |
| 2. | Receipt generation | System generates receipts after successful transactions. | PASS |
| 3. | Payment confirmation | Users receive confirmation upon payment completion. | PASS |

### 5.2.5 User Management Module

Table 10 outlines the test cases for the user management module, validating core functionalities such as viewing/editing personal details (name, email, phone), managing addresses, accessing order/appointment history, and securely changing passwords. The tests also confirm seamless navigation via the sidebar interface. All seven test cases passed, verifying the module's reliability in handling user data and interactions.

**Table 10** *Test Case Results for User Management Module*

| Module: User Management | | | |
|---|---|---|---|
| **No.** | **Test Cases** | **Description** | **Outcome** |
| 1. | View personal info | Users can view their full name, email, and phone number. | PASS |
| 2. | Edit phone number | Users can edit and update their phone number and save changes. | PASS |
| 3. | View address info | Users can access and manage their saved address information. | PASS |
| 4. | View order history | Users can view their previous and current orders. | PASS |
| 5. | View appointment list | Users can view upcoming and past treatment appointments. | PASS |
| 6. | Change password | Users can change their login password securely through the settings page. | PASS |
| 7. | Navigation | Sidebar allows seamless navigation between user profile tabs. | PASS |

### 5.2.6 Report Generator Module

Table 11 outlines the test cases for the report generator module, validating its core functionalities. The tests confirm that admins can generate sales/booking reports, view trends via graphical charts, and export/print reports. All three tests passed, ensuring the module delivers accurate, actionable insights with user-friendly visualization and export capabilities.

**Table 11** *Test Case Results for Report Generator Module*

| Module: Report Generator | | | |
|---|---|---|---|
| **No.** | **Test Cases** | **Description** | **Outcome** |
| 1. | Generate report | Admin can generate reports based on sales and bookings. | PASS |
| 2. | Graphical representation | Graphs/charts are displayed for better analysis of trends. | PASS |
| 3. | Export/download option | Reports can be exported or printed as needed. | PASS |

## 5.3 Integrated Testing

Integration testing for Tradicare validates seamless interaction between all system modules, ensuring data flows correctly across user registration, product catalog, cart management, booking appointments, and dual payment processing (products and services). These tests confirm end-to-end functionality, from product selection to checkout and from booking creation to payment, while verifying real-time inventory updates, report generation, and notification systems work cohesively. All scenarios passed, demonstrating reliable integration between components.

### 5.3.1 Customer Integrated Testing

Table 12 presents the Integrated Testing Results for Customer workflows in TradiCare, validating end-to-end interactions from registration to post-purchase notifications. The tests confirm successful integration between all critical modules, including user account management (IT-01, IT-06), product-to-cart flows (IT-02, IT-07), dual payment processing for products and bookings (IT-03, IT-04), and automated updates (inventory, reports, notifications). All test cases passed, demonstrating seamless data flow and system cohesion for customer journeys.

**Table 12** *Integrated Testing Result for Customer*

| **Test ID** | **Integration Scenario** | **Description** | **Outcome** |
|---|---|---|---|
| IT-01 | User Registration → Dashboard Access | Verify new user can register and access dashboard | PASS |
| IT-02 | Product Search → Cart Management | Test adding selected products to cart | PASS |
| IT-03 | Cart Management → Payment Processing | Validate product purchase payment flow | PASS |

| | | | |
|---|---|---|---|
| IT-04 | Booking → Payment Processing | Validate appointment booking payment flow | PASS |

**Table 12**: (cont.)

| Test ID | Integration Scenario | Description | Outcome |
|---|---|---|---|
| IT-05 | Order History → Report Generation | Confirm reports reflect both product orders and appointments | PASS |
| IT-06 | Profile Update → Login Verification | Test login with updated credentials | PASS |
| IT-07 | Real-Time Stock → Cart Management | Verify cart reflects current inventory | PASS |
| IT-08 | Payment Confirmation → Notification | Check notifications for both payment types | PASS |

### 5.3.2 Admin Integrated Testing

This Table 13 summarizes Admin Integration Testing results for TradiCare, verifying critical backend workflows. The tests confirm successful authentication (IT-A01), real-time inventory and booking synchronization (IT-A02, IT-A03), service management integration (IT-A04, IT-A06), and report export functionality (IT-A05). All scenarios passed, ensuring admins can efficiently manage system configurations with accurate data flow.

**Table 13** *Integrated Testing Result for Admin*

| Test ID | Integration Scenario | Description | Outcome |
|---|---|---|---|
| IT-A01 | Admin Login → Dashboard Access | Verify admin authentication and dashboard loading with system analytics | PASS |
| IT-A02 | Inventory Update → Product Catalog | Validate real-time product availability changes across the system | PASS |
| IT-A03 | Time Slot Management → Booking System | Confirm booking availability updates when admin sets available/unavailable times | PASS |
| IT-A04 | Services Management → Booking System | Verify service additions/modifications reflect in booking options | PASS |
| IT-A05 | Sales Report → Export Functionality | Test exporting combined data (products + bookings) to PDF/Excel | PASS |
| IT-A06 | Services List → Booking Appointment | Validate service packages appear in appointment offerings where applicable | PASS |

## 5.4 User Acceptance Testing

User Acceptance Testing (UAT) was undertaken to evaluate whether the Tradicare System fulfills its intended business functions and aligns with user expectations. The primary objective was to assess the system's reliability in managing day-to-day operations, such as appointment scheduling, real-time inventory updates, and payment processing. The system was tested for its ability to support seamless interaction between Tradicare staff and customers while ensuring data accuracy and smooth navigation across various interfaces.

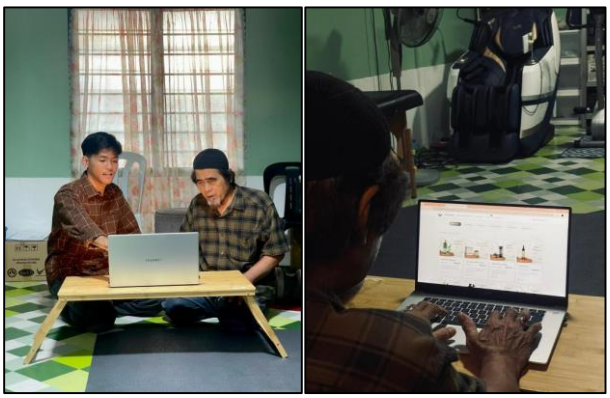


**Fig. 18** *System Testing with Encik Syukri*

The Fig. 18 illustrates the system testing phase with Encik Ahmad Syukri, owner of Tradicare, who actively participated in the UAT conducted from 15 to 21 May 2025. The testing involved key stakeholders and selected customers familiar with the center's previous manual workflows. Through structured surveys and hands-on tasks such as booking appointments, purchasing herbal products, and generating reports, valuable feedback was collected. Encik Syukri's on-site involvement at the Pekan Parit Sikom premises ensured that system performance was validated in a real-world environment, enhancing the credibility and relevance of the testing outcomes.

### 5.4.1 Testing and Evaluation Results

The testing and evaluation phase involved collecting responses from 20 participants to assess the system's usability, performance, and user satisfaction. This diverse group included individuals aged between 19 and 41, with the highest concentration at age 23 (30% of participants), and a gender distribution of 60% male and 40% female. The demographic spread ensured a balanced representation of users, providing comprehensive insights into how effectively the system caters to varied user profiles.

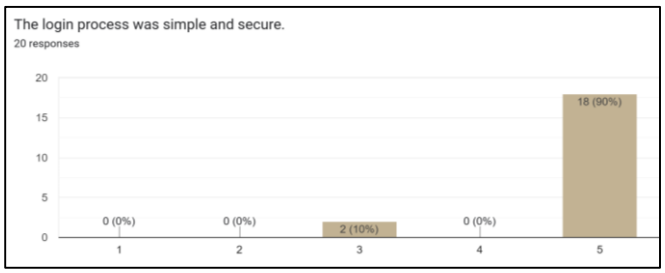



**Fig. 19:** *User Satisfaction (Login Simplicity and Security)*

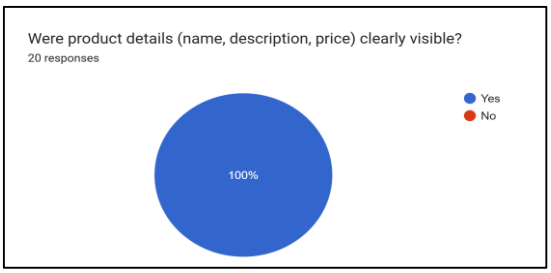



**Fig. 20:** *Visibility of Product Details*

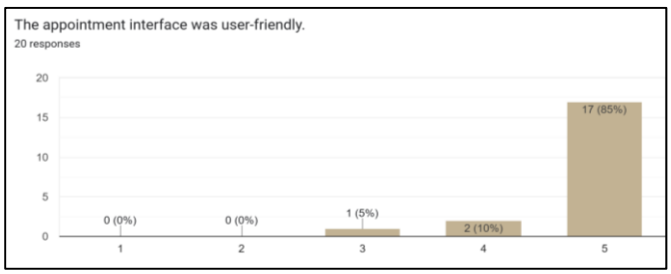



**Fig. 21:** *User-Friendliness of Appointment Interface*

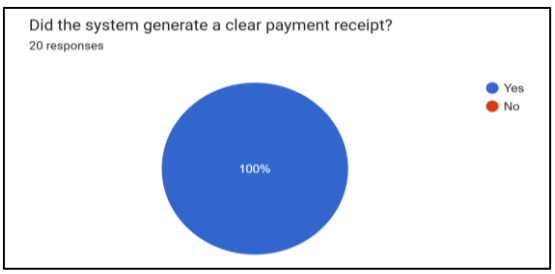



**Fig. 22:** *Clarity of Generated Payment Receipts*

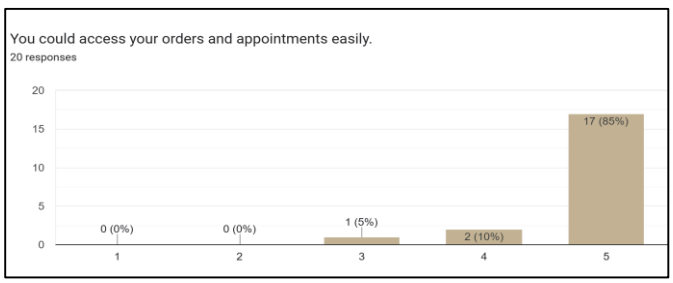



**Fig. 23:** *Ease of Viewing Orders or Booked Appointment*

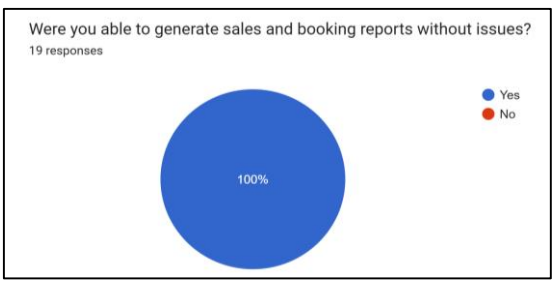



**Fig. 24:** *Successful Report Generation*

The survey results across Fig. 19 to 24 demonstrate consistently positive user experiences with the system. An overwhelming 90% of users rated the login process as excellent (Fig. 19), while all respondents confirmed clear visibility of product details (Fig. 20) and payment receipts (Fig. 22). The appointment interface received 85% top ratings for user-friendliness (Fig. 21), and order/appointment tracking was rated highly accessible by 95% of users (Fig. 23). Notably, all participants reported seamless report generation (Fig. 24), indicating the system successfully met user expectations for security, clarity, usability, and functionality across all key features. These results collectively highlight an effective, user-centric design that delivers intuitive interactions and transparent information delivery.

## 6. Conclusion and Future Work

The Tradicare Sales Management and Appointment Booking System modernizes healthcare operations through digital innovation. Replacing manual processes with automation addresses inefficiencies while improving accessibility. Features like secure registration and online scheduling fulfill goals of better service delivery. This transition prepares Tradicare for growth in a technology-driven market. The system's automation and user-centric design provide significant benefits. It eliminates manual booking errors and offers real-time updates for reliability. Customers access services through an intuitive interface with appointment reminders. Analytics tools reveal sales trends, enabling data-driven decisions for strategic growth. Some limitations require acknowledgment. The web-based platform needs stable internet, restricting some regions. The technology stack may need updates for long-term scalability. Users unfamiliar with digital tools might need adoption support. Continuous security updates remain essential against cyber threats. Future improvements will expand functionality and accessibility. AI integration will enable personalized health recommendations. Multi-language support will serve diverse communities. A mobile app will increase convenience, while biometric authentication strengthens security. Cloud upgrades will ensure scalable growth. The Tradicare system shows how digital solutions can transform traditional businesses. Combining efficiency with great user experiences creates long-term success potential. The adaptable design ensures future relevance, positioning Tradicare as a leader in digital healthcare innovation.

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## Conflict of Interest

The authors explicitly declare that there exists no conflict of interests whatsoever regarding the research findings or publication of this paper.

## Author Contribution

The author alone conceived, designed, executed, and analyzed the entire study while independently preparing the complete manuscript for publication.

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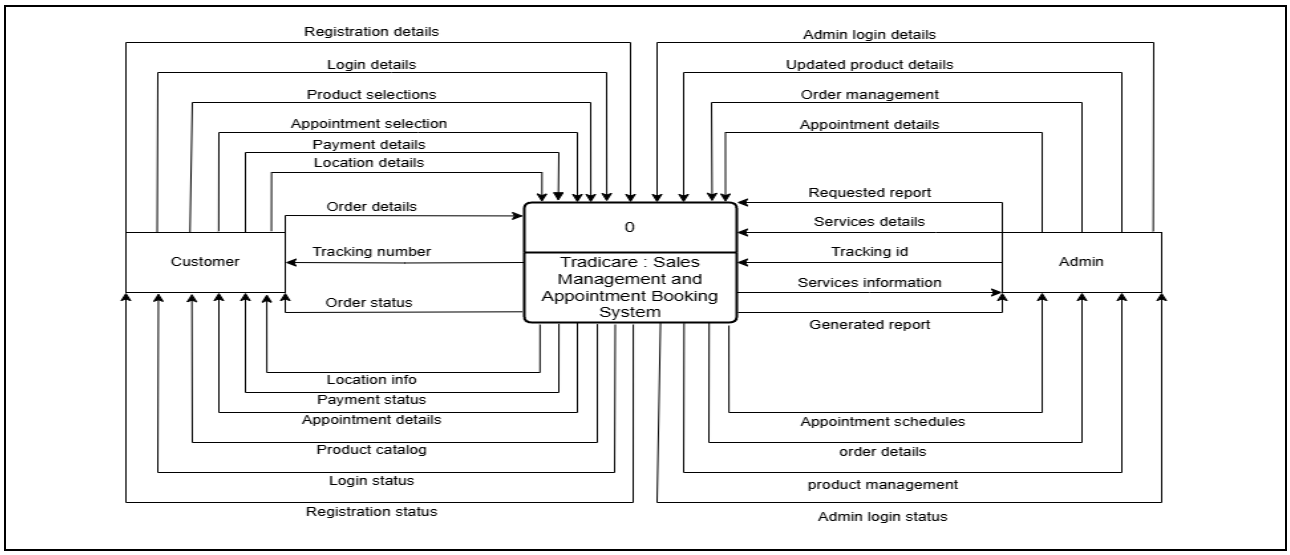
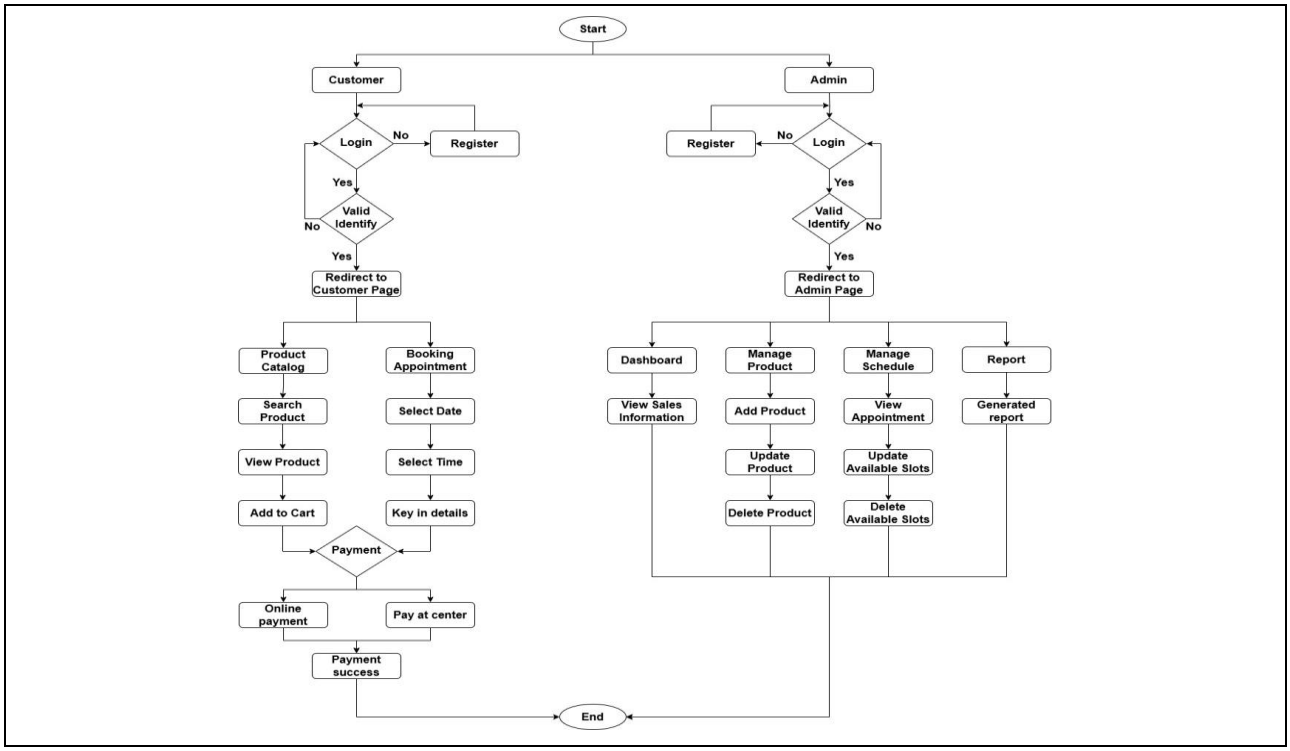
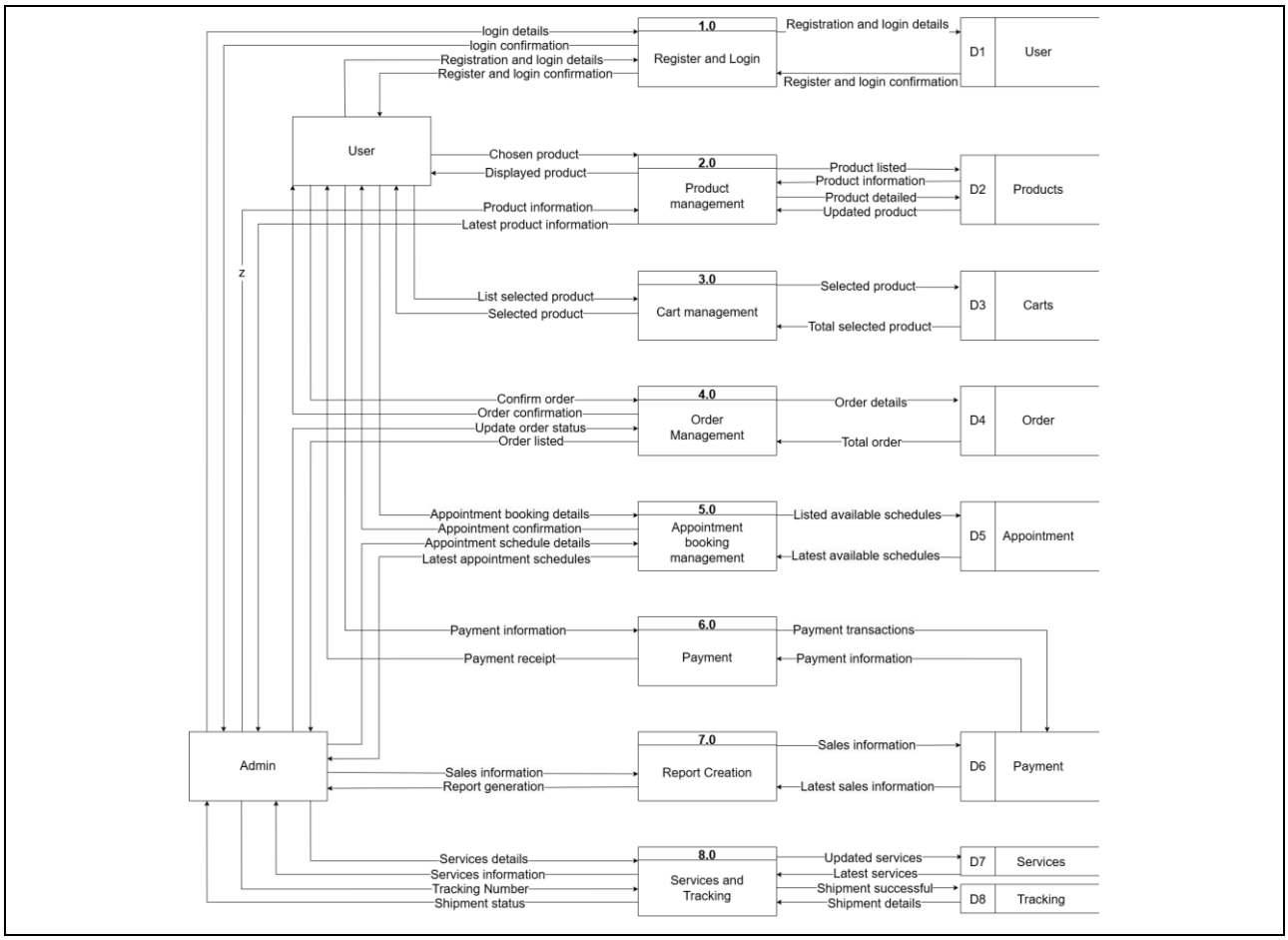
## **Appendix A:** *Context Diagram Tradicare*



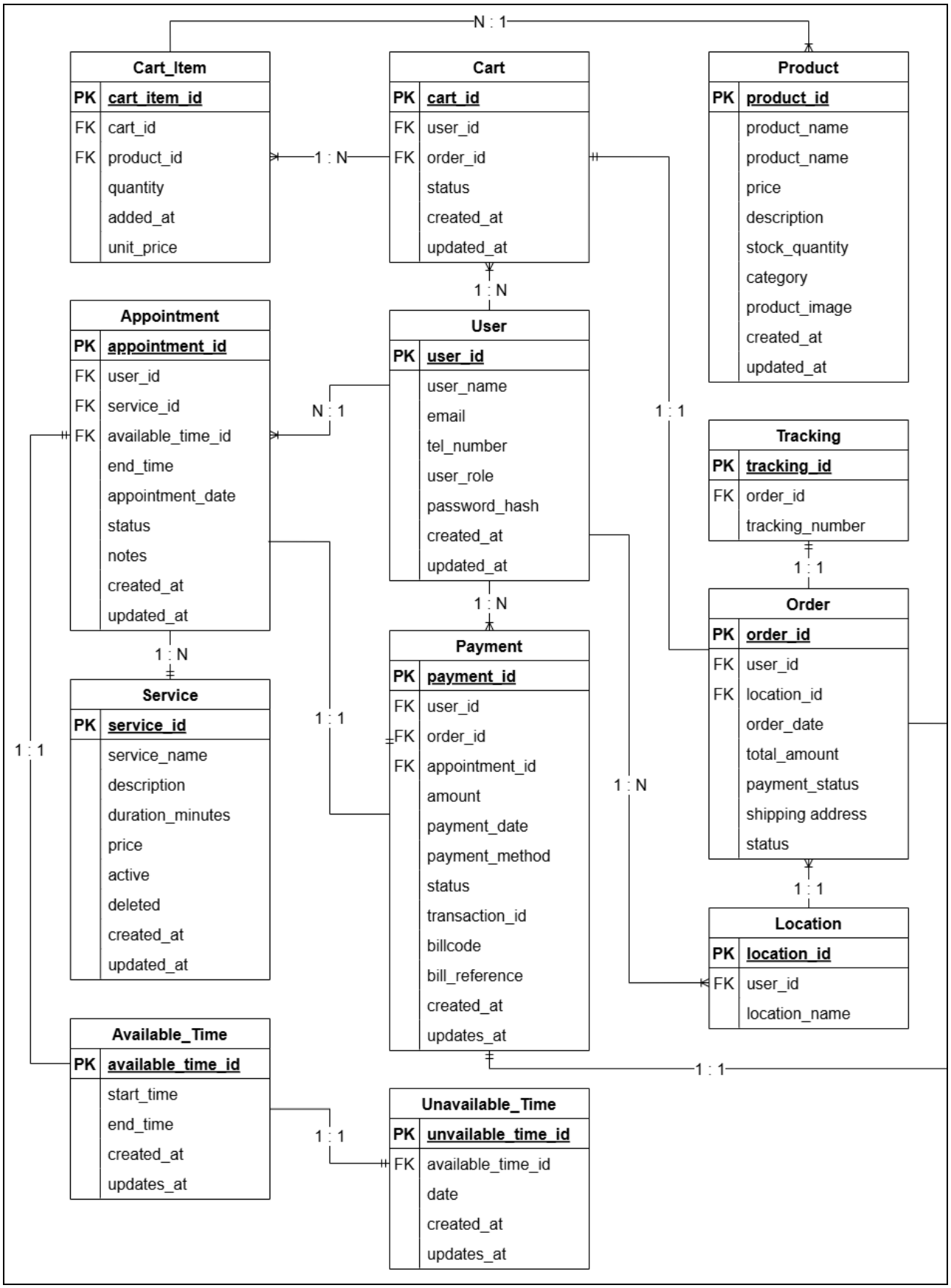

## **Appendix B:** *Flowchart Diagram Tradicare*




## **Appendix C:** *Data Flow Diagram(level 0) Tradicare*




## **Appendix D:** *Entity Relationship Diagram Tradicare*


N : 1
Cart_Item
PK cart_item_id
FK cart_id
FK product_id
quantity
added_at
unit_price
1 : N
Cart
PK cart_id
FK user_id
FK order_id
status
created_at
updated_at
Product
PK product_id
product_name
product_name
price
description
stock_quantity
category
product_image
created_at
updated_at
1 : N
Appointment
PK appointment_id
FK user_id
FK service_id
FK available_time_id
end_time
appointment_date
status
notes
created_at
updated_at
N : 1
User
PK user_id
user_name
email
tel_number
user_role
password_hash
created_at
updated_at
1 : 1
Tracking
PK tracking_id
FK order_id
tracking_number
1 : 1
1 : N
1 : N
Order
PK order_id
FK user_id
FK location_id
order_date
total_amount
payment_status
shipping address
status
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Service
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service_name
description
duration_minutes
price
active
deleted
created_at
updated_at
1 : 1
1 : 1
Payment
PK payment_id
FK user_id
FK order_id
FK appointment_id
amount
payment_date
payment_method
status
transaction_id
billcode
bill_reference
created_at
updates_at
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Location
PK location_id
FK user_id
location_name
Available_Time
PK available_time_id
start_time
end_time
created_at
updates_at
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Unavailable_Time
PK unavailable_time_id
FK available_time_id
date
created_at
updates_at