System Requirements Model

Oil Refining Process Management System

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Contents

Section 1 Purpose

1.1 Executive Summary

We've defined the main parts of our Information System and how they function and interact, which is illustrated in a detailed diagram. Key users and their activities were identified and clearly outlined in a use case model. To better understand the flow of these activities, we created diagrams that show the sequence of steps for two main actions. We also charted how certain parts of the system change state in response to user actions. This groundwork lays a clear path for our developers to build a user-friendly system.

1.2 Mission statement

We believe mimicking nature’s cyclical processes will help us restore the earth. We leverage technology to repurpose used cooking oil to biofuel. We are sustained by the produce of this earth, now it’s time for our actions to give back to the world.

Section 2 Findings Summary

Many companies now prioritize sustainable practices, including the responsible disposal and recycling of used oil. By choosing environmentally friendly disposal methods, such as recycling and energy recovery, companies can reduce their environmental footprint and contribute to the conservation of resources.

Given the complexity of regulations and the technical challenges associated with disposing of used oil, companies often work with environmental consultants and waste management experts to develop compliant and sustainable disposal strategies. In these situations, Back to the World can assist businesses in disposing of spent oil appropriately.

The “Systems Improvement” questionnaire was designed to identify and measure the functionality of the current waste management systems of stakeholders. The survey was conducted using a stratified sample to gain specific insight from the stakeholders. The results indicated that lack of infrastructure is a main constraint for businesses seeking to responsibly dispose of theri oil waste. The B2W project intends to provide companies a safe, secure and efficient infrastructure to reduce their environmental impact.

Section 3 System Requirements

3.1 System User

Our goal is to make sustainability available for every business. As we aim to bridge the gap between organization and their sustainable goals, collaboration with restaurants, commercial kitchens, college campuses, household as well as biofuel producers is necessary. Our agile method requires continuous user engagement so feedback from the product donor and recipient will ensure that the system considers users requirements from all aspects are met.

3.2 User Stories

1. As a homeowner, I collaborate with Back to the World to address improper waste disposal, aiming to reduce the likelihood of drain pipe clogging, so that I can avoid the inconvenience and expense of having to call a plumber for assistance.
2. As an environmentalist, I want to have a positive impact on the environment and reduce waste produced by improper disposal of used oil.
3. As a fast-food manager, I want to reduce my company's waste footprint, so that our operations are more environmentally friendly.
4. As a college campus because our students care about the environment, we collaborate with Back to the World because the used oils from our campus diner and dorms have a place to be stored properly and reduce waste to the environment.
5. As a fisherman, I contribute my time and effort to Back to the World to prevent the improper disposal of oil, ensuring it does not contaminate the ocean, animals, and overall harm the environment.

3.3 System Capability

Our system facilitates the transportation of waste from the donor to the receiver. B2W hosts and provides a secure platform for all communication on our web service. Users will have authorized access to the B2W portal when they can schedule oil pickups, confirm oil drop offs, and send notification of orders or system issues and requests. Our services also included deployment of products by certified personnels. B2W's goal is to promptly alleviate users from the hassle of storing and handling oil once it's no longer in use. However, user compliance is required.

3.4 System Conditions

1. Technical constraints

   Our infrastructure sets us apart from our competitors. The system will utilize software that is secure and reliable for use across various organization platforms. The system's hardware will include certified transportation vessels and storage compartments. Our system also includes innovative devices that will help users with the packaging process.

2. Regulatory constraints

   Dealing with a variety of organizations, different compliance protocols per user must be met for data, privacy and other industry standards.

   State regulation also determines the limitation for product permitted per transport.

3. Environmental constraints

   External factors such as weather, physical locations for pickup and drop off will impact the deployment of the product.

4. Compatibility constraints

As this project is collaborating with various businesses, different operating systems are involved. Our platform must be able to integrate with many different systems and maintain its performance across all organizations.

3.5 Functional Requirements

1. User Authentication

   The system will provide login functionality. Registered users will have access to their account using a username and password.

2. Scheduling Functionality

   Once users are logged in, oil donors will be able to schedule pick ups.

   On the other hand, the oil recipient will be able to confirm the oil has been dropped off.

3. Product Verification and Confirmation

   Users must adhere to safety protocols when containing and packaging the product. This process will ensure that users comply with specific guidelines for preparing the used oil for collection.

4. Inventory management

   The system will maintain real-time inventory levels of raw materials, in-process goods, and finished products. Features will include automated reordering, low-stock alerts, and inventory forecasting.

5. Tracking

   Users will be able to track the status of their pickup and deliveries in real-time. The system will provide updates via email or SMS notifications.

6. Request

   Verified users will be able to contact B2W directly and request required equipment: containers, lids, packaging tape, labels, scanning devices, etc. Users may also report any issues or leave us feedback.

3.6 Nonfunctional Requirements

1. Performance

   To ensure a responsive user experience, the system should respond to users' interaction during a normal load time of 3 seconds.

2. Reliability

   Scheduled maintenance will be made known to the user in advance. After any update the system should run relatively the same.

3. Security

   Developers build the system with security in mind from the ground up. The system will be embedded with standard encrypted protocols to protect users data. Users must also use multifactor authentication and will be required to change their account password on a monthly basis.

4. Scalability

   The systems will be designed to accommodate for the 10,000 coinciding users while maintaining performance.

5. Usability

   The interface will be designed from a “user centric” point of view. It will allow for automation, select and reset ability, and adhere to accessibility standards.

3.7 System Interface

Figure 7.1 is the main portal for users to learn about our service and become partners.

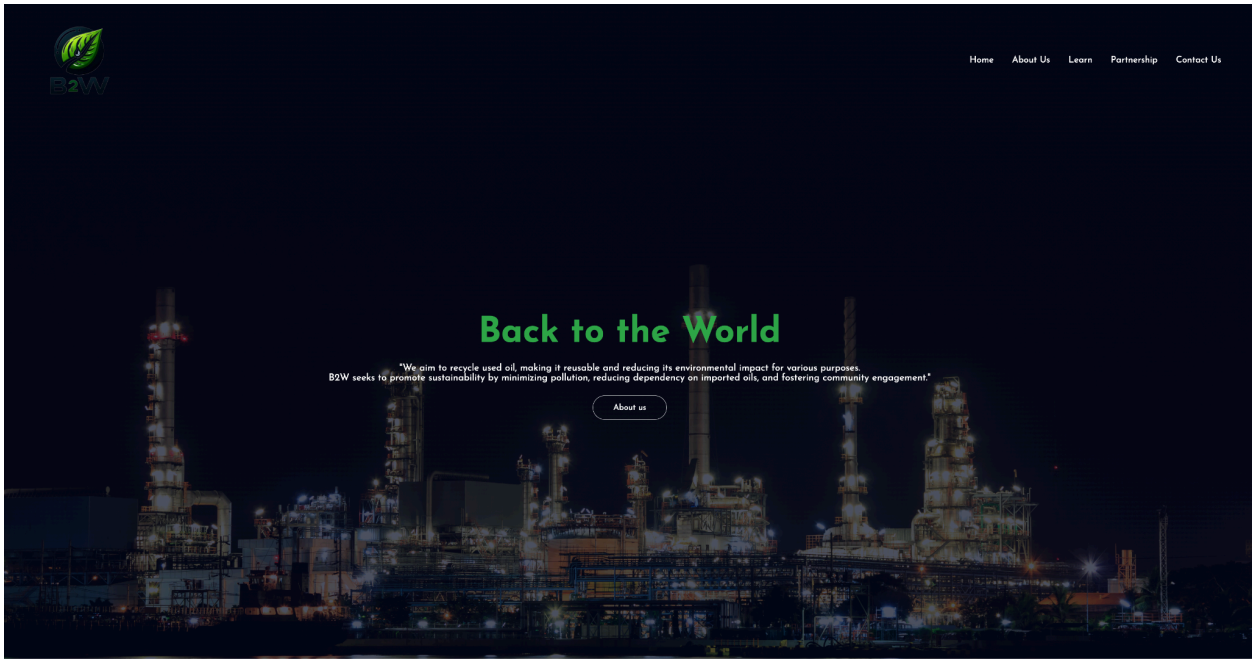


Figure 7.1

Section 4 System Architecture

4.1 Hardware

1. Sensor Devices

   These devices will be used to monitor for container levels, oil temperature and humidity.

2. Scales

   Weighing scales will ensure accurate product measurements.

3. GPS Device

   Transportation vehicles will have GPS devices installed to enable tracking of the vehicle's movement.

4. RFID Tags

   Tags be attached to each oil container. Upon departure and arrival, this will provide the system with accurate inventory and ensure integrity of the products being transported.

5. Communication Device

   Mobile devices such as tablets, smartphones, laptops, will be pre configured with the system software. This will prevent compatibility issues and reduce security risk.

6. Surveillance Systems

   Storage and designated pickup and dropoff locations will have cameras installed on site to ensure compliance and discourage illegal activities.

4.2 Software

1. Waste Management System

   B2W's Software as a Service provides users with a platform for managing waste. The software includes built in features where users have complete transparency on how their waste is being disposed of. This includes scheduling, reporting, and tracking.

2. GIS

   This system will leverage geographic data to optimize the most efficient routes for endpoints to limit the amount of carbon emission during transport.

3. Reporting Tools

   Data analysis of the software and devices used will be performed. This insight will allow us to generate reporting of the operational system, highlighting areas for improvement.

4. CRM

   Customer Relation software allows us to manage relationships with users. This centralized platform will include features for users to make service requests or inquiries.

5. Compliance

   Compliance software generates reports that ensure all parties are up to date on the regulation and permits as it pertains to one's industry.

Section 5 Regulation

5.1 Environmental Regulations

a. Resource Conservation and Recovery Act (RCRA)
    i. RCRA is a federal law in the United States that provides the framework for the proper management of hazardous and non-hazardous solid waste. Under RCRA, used oil is considered hazardous waste as it exhibits characteristics such as ignitability and toxicity.
b. Clean Water Act (CWA)
    i. CWA aims to eliminate the discharge of pollutants into the nation's water. For an oil refining operation, this means that any discharges into surface waters must comply with the national discharge standards.
    ii. Facilities must obtain a National Pollutant Discharge Elimination System (NPDES) permit which sets the limits on what can be discharged to ensure it does not harm water quality or public health.

5.2 Health and Safety Regulations

a. Occupational Safety and Health Administration Standards (OSHA)
    i. OSHA regulations are designed to ensure safe and healthful working conditions by setting and enforcing standards. For an oil refinery, this includes regulations on hazardous chemicals, fire safety, emergency preparedness, and occupational exposure limits to harmful substances.
b. Process Safety Management (PSM) of Highly Hazardous Chemicals

i. A subpart of OSHA which requires companies that handle highly hazardous chemicals to develop a comprehensive management program that covers aspects such as process safety information, process hazard analysis, operating procedures, and employee training.

ii. For an oil refining business, this means implementing systems and practices to prevent and mitigate the release of hazardous chemicals that could lead to a catastrophic incident, such as a fire or explosion.

5.3 Business and Operational Licenses

a. Local Zoning Ordinance

i. Before establishing an oil refinery, it is a must that the selected location is zoned for industrial use that permits such operations. Zoning laws are local laws that dictate how certain parcels of land can be used.

b. Air Quality Permits

i. AQ permits are often required by state or local environmental agencies, regulate the amount of pollutants a facility can emit into the air. For an oil refinery, obtaining AQ permits involves demonstrating that your operations will meet state and federal air pollution control standards, including limits on specific pollutants, operational practices, and emission controls.

5.4 Product Standards and Liability

a. Federal Trade Commission's Regulations (FTC)

i. FTC enforces regulations related to advertising and product labeling. For recycled oil products, this means ensuring that any claims made about the product, such as its quality or environmental benefits, are truthful, not misleading, and supported by evidence.

b. Uniform Commercial Code (UCC)

i. While UCC is not a law specific to oil refining, the UCC governs sales and commercial transactions in the United States and requires that goods sold meet certain quality standards. Under the UCC, oil products sold must be of a quality that meets the contract specifications agreed upon with the buyer. Non-compliance can lead to liability for breach of contract and product warranties.

Section 6 Protocols and Implementation

6.1 Physical Security Protocols

a. Access Control System

    i. Install electronic access control systems to manage and monitor access to sensitive areas within the refinery. Biometric scanners or RFID card readers can be implemented to restrict access to authorized personnel only.

b. Surveillance System

    i. Deployment of a network of CCTV cameras around the facility to monitor and record activities in real time. Ensure coverage of critical areas such as entry points, processing units, and storage tanks. Motion sensors and alarm systems can also be implemented to detect unauthorized access or movements during off-hours.

6.2 Cyber Security Protocols

a. Network Security Measures

    i. Protection of IT (information technology) and OT (operational technology) networks with firewalls, intrusion detection systems (IDS), and intrusion prevention systems (IPS).

b. Data Encryption and Backup

    i. Encrypt sensitive data both in transit and at rest to protect it from unauthorized access. Implementation of regular backup procedures for critical data and systems, and store backups in a secure, off-site locations to ensure business continuity in case of data loss or cyber incidents.

6.3 Environmental Security Protocols

a. Hazardous Material Handling Protocols

    i. Development and implementation of standard operating procedures (SOPs) for the safe handling, storage, and disposal of hazardous materials. Train employees on these procedures and conduct regular drills to ensure preparedness.

b. Emergency Response and Spill Containment Plans

    i. Prepare comprehensive emergency response plans for potential incidents, including fires, chemical spills, and explosions. Facilities must have been equipped with spill containment systems and fire suppression equipment, and train staff in emergency response procedures.

Section 7 Training

7. 1 Safety and Hazardous Material Handling

a. Employee training on the proper handling, storage, and disposal of hazardous materials, including used oil and any chemicals used in the refining process.
    i. Classroom training complemented by hands-on training exercises.

7.2 Emergency Response and First Aid

a. Comprehensive training on emergency response procedures, including fire safety, spill response, and evacuation protocols. First aid training should cover basic lifesaving skills and how to respond to chemical exposures or burns
b. Theoretical and practical drills that simulate emergency situations. Engage external experts or local emergency service to conduct specialized training.

7.3 Cybersecurity Awareness

a. Educate employees about cybersecurity threats such as phishing malware, and social engineering attacks. Training should cover safe online practices, secure handling of sensitive information, and procedures for reporting suspected cyber incidents
b. Interactive learning courses and workshops can be effective. Regularly update the content to reflect the latest cyber threats and safe practices.

7.4 Operational Security Procedures

a. Train operational staff on security procedures related to access control, surveillance monitoring, and incident reporting. Include protocols for verifying identifies and handling unauthorized access attempts.
b. Role-playing exercises and scenario-based training can help staff understand and remember the procedures.

7.5 Environmental Protection and Compliance

a. Provide training on environmental regulations relevant to your operations, including waste management, emissions control, and spill prevention. Emphasize importance of compliance and the potential consequences or regulatory violations
b. Classroom training with case studies of past incidents can be effective for illustrating best practices and lessons learned.

Section 8 System Modeling

8.1 Functional Decomposition Diagram

The Functional Decomposition Diagram (FDD) for "Back to the World" offers a detailed overview of our organizational structure, highlighting the diverse departments and their essential roles in our operations. It serves as a roadmap, illustrating how each department contributes to the overarching goals through specific tasks and responsibilities. This diagram not only enhances operational efficiency but also facilitates better communication and collaboration across the organization.

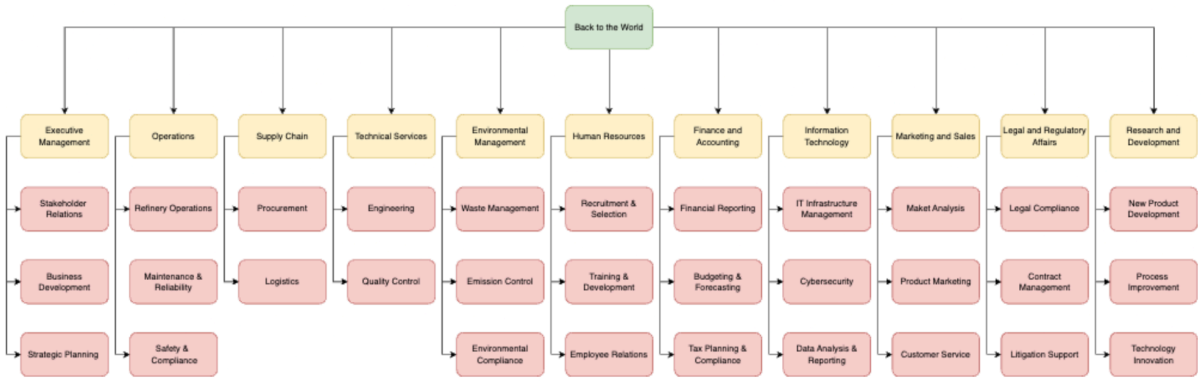


Figure 8.1

8.2 Context Diagram

Figure 8.2 is a top level view of B2W's information system's boundaries and scopes. Figures 8.2.1 demonstrates the databases involved, while Figure 8.2.2 elaborate certain processes.The external entities are as followed:

1. SUBSCRIBERS: These are verified users who have accounts with our platform. They utilize their credentials to access their account, enabling them to place orders for oil pickup or collection. Our subscribers are vital to our model as they initiate the demand for service.
2. WAREHOUSE: This is our physical facility where a variety of oil products will be stored. Our warehouse is the focal point for storing, sorting, and verifying packaging as orders as both received and dispatched. This ensures safety and the quality and integrity of products.
3. TRANSPORTATION: This entity represents our GIS system which dynamically generates the most optimal routes for product delivery. This optimization reduces delivery time, fuel consumption, and overall operational cost. Transportation is crucial for timely and efficient delivery.
4. MANAGEMENT: This represents the organization's leadership. The head of departments receive system generated insight. The metric and key performance indicators from these reports, provide each department with valuable insight about overall performance. Management will leverage this insight to identify areas for improvement and make informed strategy decisions that will enhance performance.

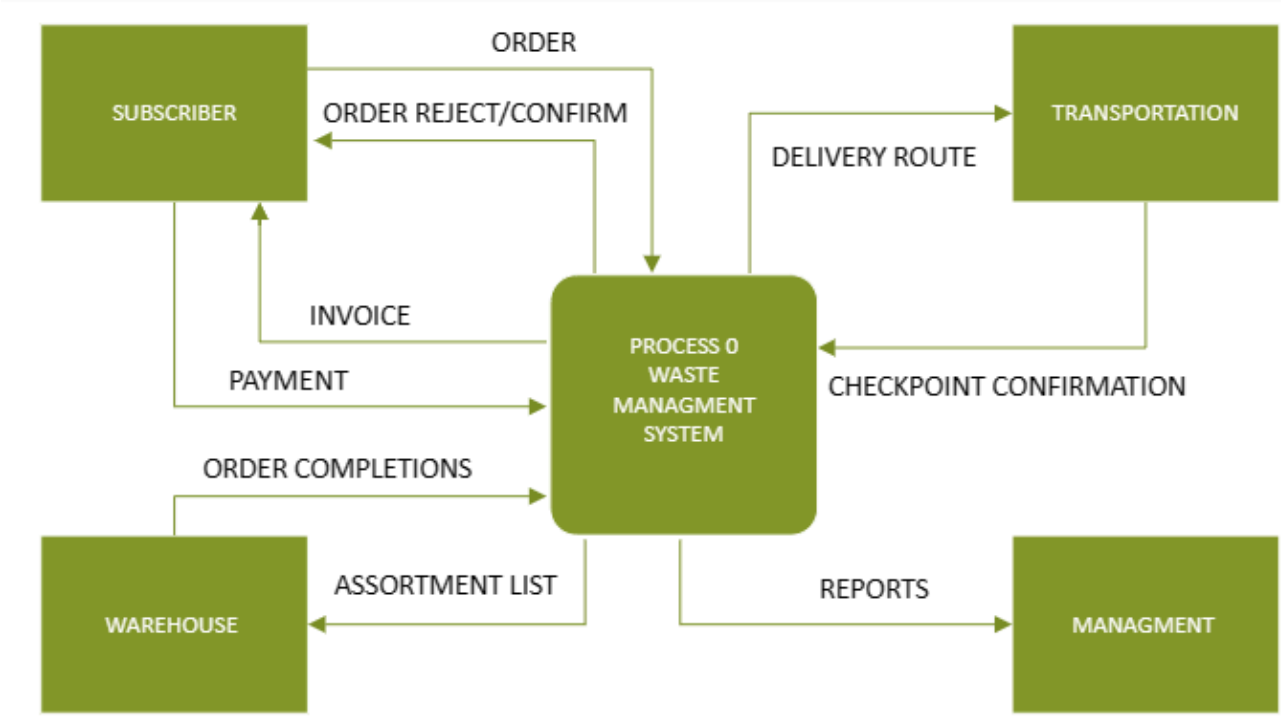

SUBSCRIBER
ORDER
ORDER REJECT/CONFIRM
TRANSPORTATION
DELIVERY ROUTE
INVOICE
PROCESS 0
WASTE
MANAGMENT
SYSTEM
PAYMENT
CHECKPOINT CONFIRMATION
ORDER COMPLETIONS
WAREHOUSE
ASSORTMENT LIST
REPORTS
MANAGMENT

Figure 8.2

8.2.1 Level 0 Diagram

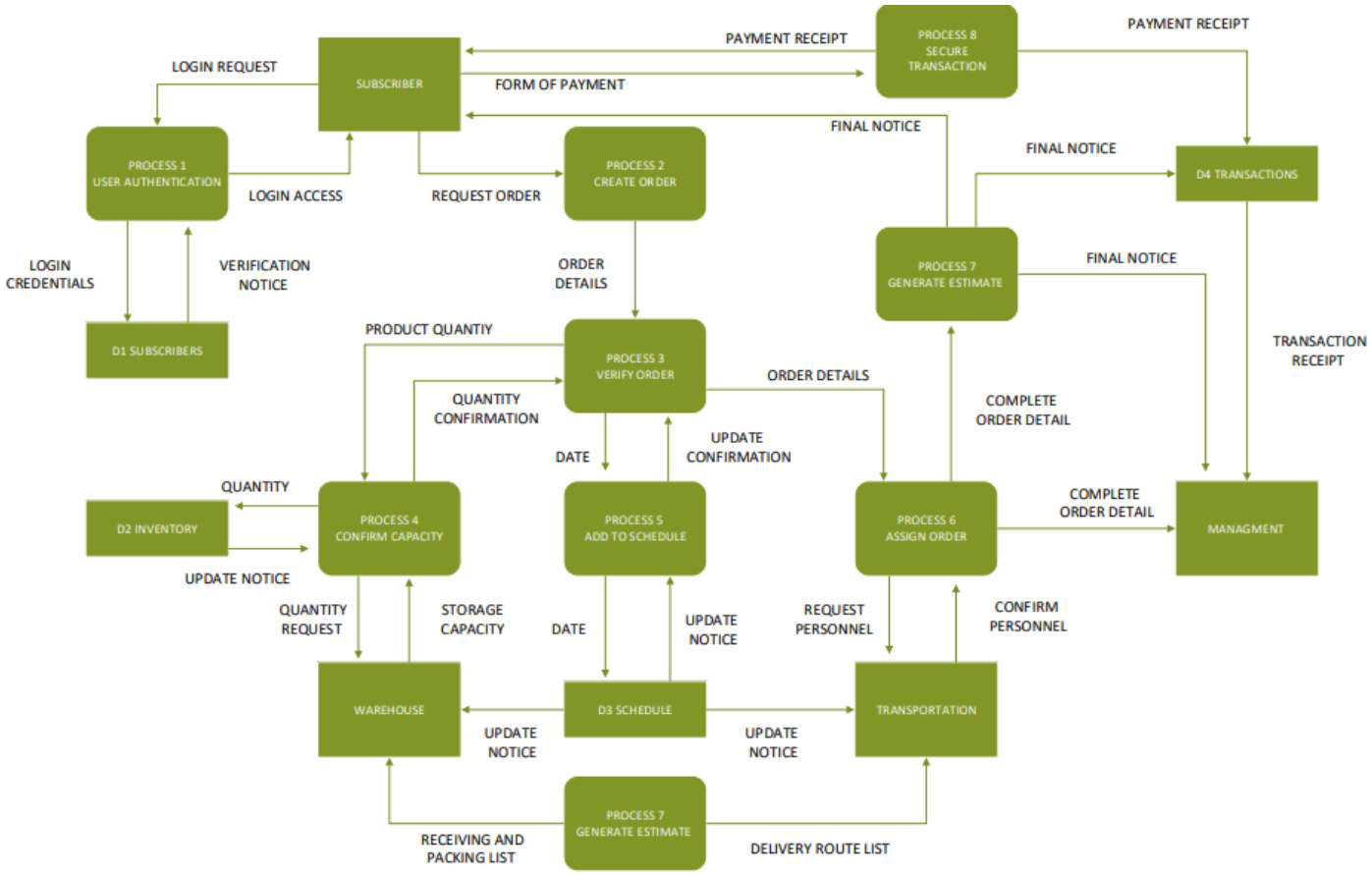


Figure 8.2.1

8.2.2 Level 1 Diagram

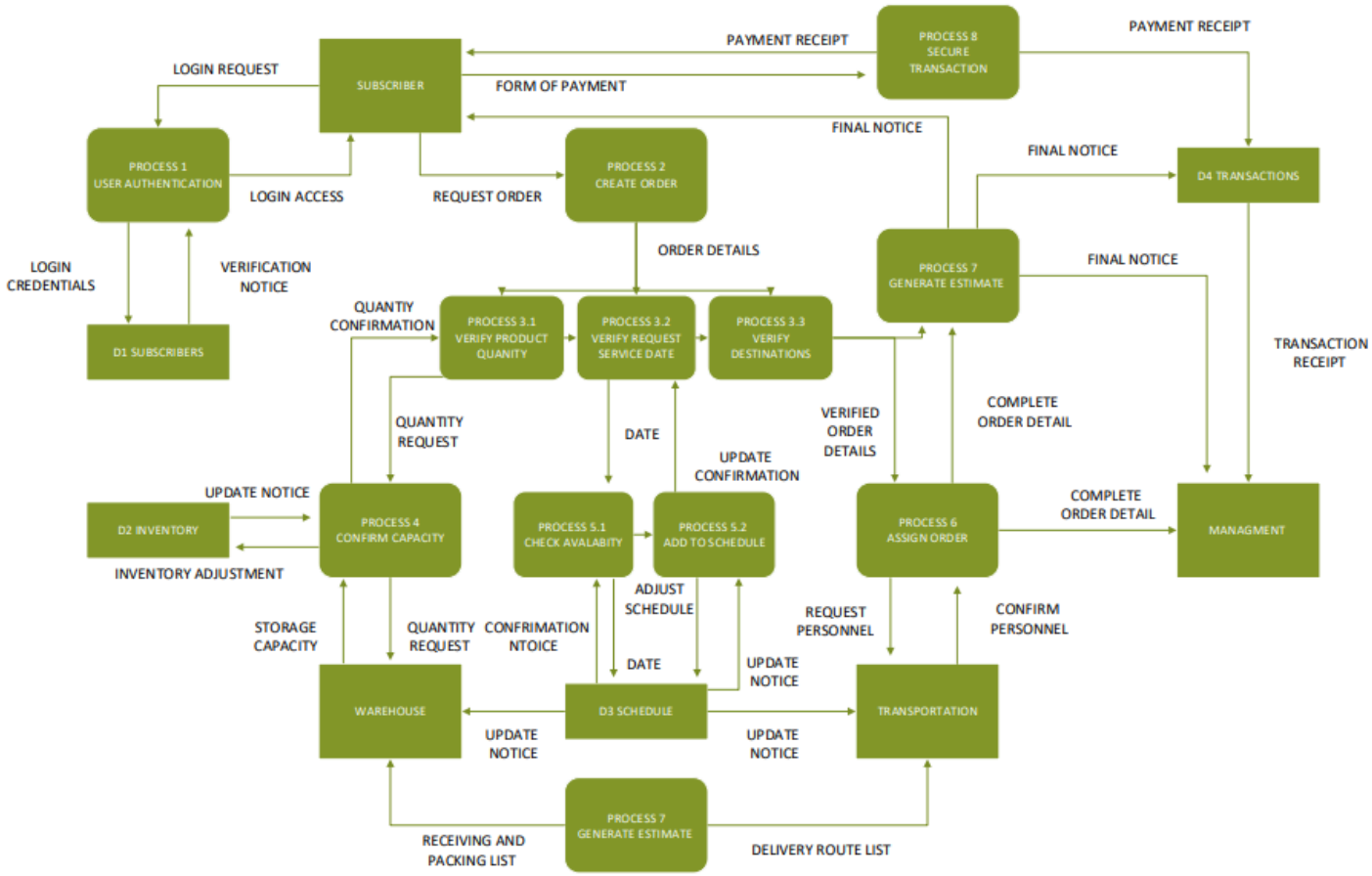


Figure 8.2.2

Section 9 Data Dictionary Report

1. Functional Decomposition Diagram
    a. Executive Management
        i. Suppliers
            1. Provide raw materials and services.
        ii. Customers
            1. Receive products and provide feedback.
        iii. Regulatory Bodies
            1. Set standards for operations, safety, and environmental compliance.
        iv. Partners
            1. Engage in strategic alliances for business development.
    b. Functions/Processes
        i. Executive Management
            1. Strategic Planning
                a. Sets long-term goals and defines the strategies to achieve them.
            2. Business Development
                a. Focuses on identifying and creating new partnership opportunities and markets.
            3. Stakeholder Relations
                a. Manages communication and relationships with investors, communities, and other key stakeholders.

ii. Operations

1. Refinery Operations
    a. Oversees the day-to-day processing of different types of oil into various products.
2. Maintenance & Reliability
    a. Ensures all equipment operates reliably and is maintained properly.
3. Safety Programs
    a. Implements and monitors safety protocols to protect employees and equipment.

iii. Supply Chain

1. Procurement
    a. Manages the acquisition of goods and services needed for operations.
2. Logistics
    a. Manages the transportation and distribution of raw materials and finished products.

iv. Technical Services

1. Engineering
    a. Applies engineering expertise to optimize processes and design new projects.
2. Quality Control

a. Ensures products meet quality standards through rigorous testing and evaluation.

v. Environmental Management

1. Waste Management

a. Manages the reduction, disposal, and recycling of waste materials.

2. Emission Control

a. Implements measures to reduce emissions and meet environmental standards.

3. Environmental Compliance

a. Ensures all operations adhere to environmental laws and regulations.

vi. Human Resources

1. Recruitment & Selection

a. Attracts and selects candidates to fill job openings.

2. Training & Development

a. Provides employees with the skills and knowledge for their roles and growth.

3. Employee Relations

a. Manages the relationship between the company and its employees to ensure satisfaction and productivity.

vii. Finance and Accounting

1. Financial Reporting

a. Prepares financial statements and reports for management and external use.

2. Budgeting & Forecasting
    a. Plans future financial operations to ensure fiscal health and stability.
3. Tax Planning & Compliance
    a. Manages tax obligations and strategies to comply with laws and optimize tax positions.

viii. Information Technology

1. IT Infrastructure Management
    a. Oversees the technology infrastructure to support operations.
2. Cybersecurity
    a. Protects information systems from cyber threats and breaches.
3. Data Analysis & Reporting
    a. Utilizes data to inform decision-making and report on performance.

ix. Marketing and Sales

1. Market Analysis
    a. Researches and analyzes market trends to inform strategy.
2. Product Marketing
    a. Develops marketing strategies and materials for products.

3. Customer Service
    a. Manages customer inquiries, complaints, and feedback to ensure satisfaction.

x. Legal and Regulatory Affairs
1. Legal Compliance
    a. Ensures all business activities comply with laws and regulations.
2. Contract Management
    a. Oversees the creation, negotiation, and fulfillment of contracts.
3. Litigation Support
    a. Provides assistance in legal disputes and litigation processes.

xi. Research and Development
1. New Product Development
    a. Innovates and develops new products to meet market needs.
2. Process Improvement
    a. Continuously seeks ways to improve efficiency and reduce costs.
3. Technology Innovation
    a. Explores and implements new technologies to enhance operations.

c. Data Flows
    i. Data about raw materials and services from *Suppliers* to *Procurement*
    ii. Financial data from *Finance and Accounting* to *all departments* for budgeting.
    iii. Employee data from *Recruitment & Selection* to *Human Resources* Management for training and development
    iv. Product and quality data from *Operations* to *Technical Services* for quality control
    v. Market and customer feedback data from *Customers* to *Marketing and Sales*
d. Data Stores
    i. Employee Database
        1. Stores details on recruitment, training, and employee relations.
    ii. Financial Database
        1. Contains financial reports, budgets, and tax records.
    iii. Operations Database
        1. Logs information on refinery operations, maintenance schedules, and safety records.
    iv. Supply Chain Database
        1. Records details on procurement, inventory, and logistics.
    v. Product Database
        1. Holds information on product specifications, quality control results, and environmental compliance.

e. Key Data Elements and Records
    i. Employee Records
        1. Personal details, job roles, training history
    ii. Financial Records
        1. Income statements, balance sheets, budget forecasts
    iii. Operational Records
        1. Production volumes, maintenance logs, safety incidents
    iv. Supply Chain Records
        1. Supplier contracts, inventory levels, distribution plans
    v. Product Records
        1. Product specifications, quality tests results, market research findings

2. Context Diagram
    a. External Entities
        i. Subscribers
            1. Receive products and provide feedback.
        ii. Suppliers
            1. Providing goods to the Warehouse
        iii. Regulatory bodies
            1. For compliance and reporting
        iv. Warehouse
            1. Quantity of product available for an order
        v. Management

1. Order details and other reports for strategic decision-making

b. Functions/Processes

i. Waste Management System

1. The service B2W provides

c. Data Flows

i. Order, Invoice, and Payment data between Customers and Order Management System

ii. Delivery Route planning data between Logistics and Distribution and Order Management System

iii. Inventory data between Inventory Management and Order Management System

iv. Compliance data between Safety and Compliance Monitoring and Logistics and Distribution

v. Reports flow to Corporate Reporting from all systems for synthesis

3. Level 0 Diagram

a. External Entities

i. Subscribers

1. Receive products and provide feedback.

ii. Suppliers

1. Providing goods to the Warehouse

iii. Regulatory bodies

1. For compliance and reporting

b. Functions/Processes

i. User Authentication
    1. Ensure only authorized users have access to our platform, thereby enhancing security.

ii. Order Creation
    1. Users initiate the creation of orders by providing the required details for subsequent processing.

iii. Order Verification
    1. The system validates the information submitted by the user.

iv. Capacity Confirmation
    1. The system checks the warehouse storage availability and transportation capacity for the requested order.

v. Add to Schedule
    1. Once the capacity and order are confirmed, the order is placed on the delivery schedule.

vi. Order Assignment
    1. The order will be assigned to our certified personnel responsible for order fulfillment.

vii. Generate Estimate
    1. The system will calculate the estimated cost for the order, optimal route for delivery, and reportings for management.

viii. Secure Transaction
    1. Users complete the transaction with a secure payment option, as confidentiality is crucial to maintain.

c. Data Stores
    i. Order Database
        1. Stores orders, invoices, and payment records.
    ii. Inventory Database
        1. Contains assortment lists and stock levels.
    iii. Compliance Database
        1. Logs waste management data and checkpoint confirmations.
    iv. Transportation Database
        1. Keeps records of delivery routes and transportation details.

d. Key Data Elements and Records
    i. Order Records
        1. Customer details, order specifics, payment and invoice histories.
    ii. Inventory Records
        1. Item descriptions, quantities, warehouse locations.
    iii. Compliance Records
        1. Waste disposal logs, safety checks, regulatory submissions.
    iv. Transportation Records
        1. Vehicle details, delivery schedules, route maps.

4. Level 1 Diagram
    a. Functions/Processes
        i. Order Verification
            1. Verify Product Quantity

a. The system's inventory database will be referenced to ensure placement for the order's proposed quantity.

2. Verify Request Service Date
    a. The user submitted details must align with the system's schedule database.
3. Verify Destinations
    a. This data must be verified to ensure the proper pickup and delivery. The system will use this information to delegate the most efficient route for this order.

ii. Add to Schedule

1. Check Availability
    a. The system's schedule database will be referenced to ensure there are no conflicts for the proposed service date.
2. Add to Schedule
    a. If no conflicts are detected then the database will be update with the new order request.

Section 10 Process Description

Verify Product Quantity

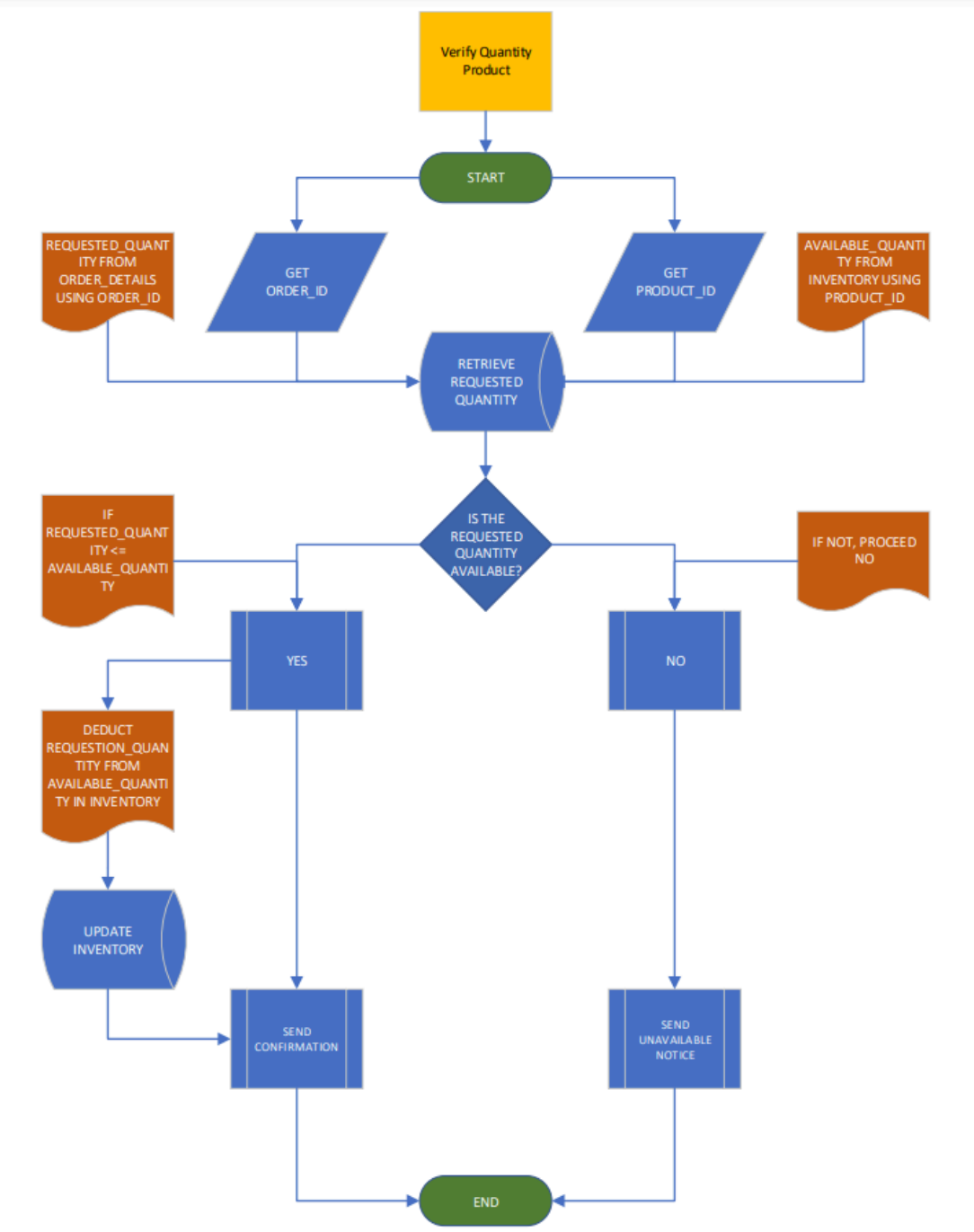
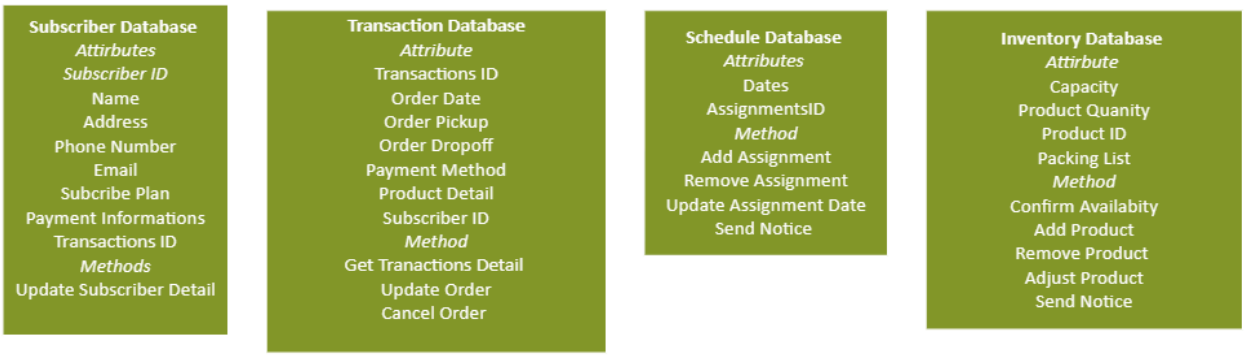


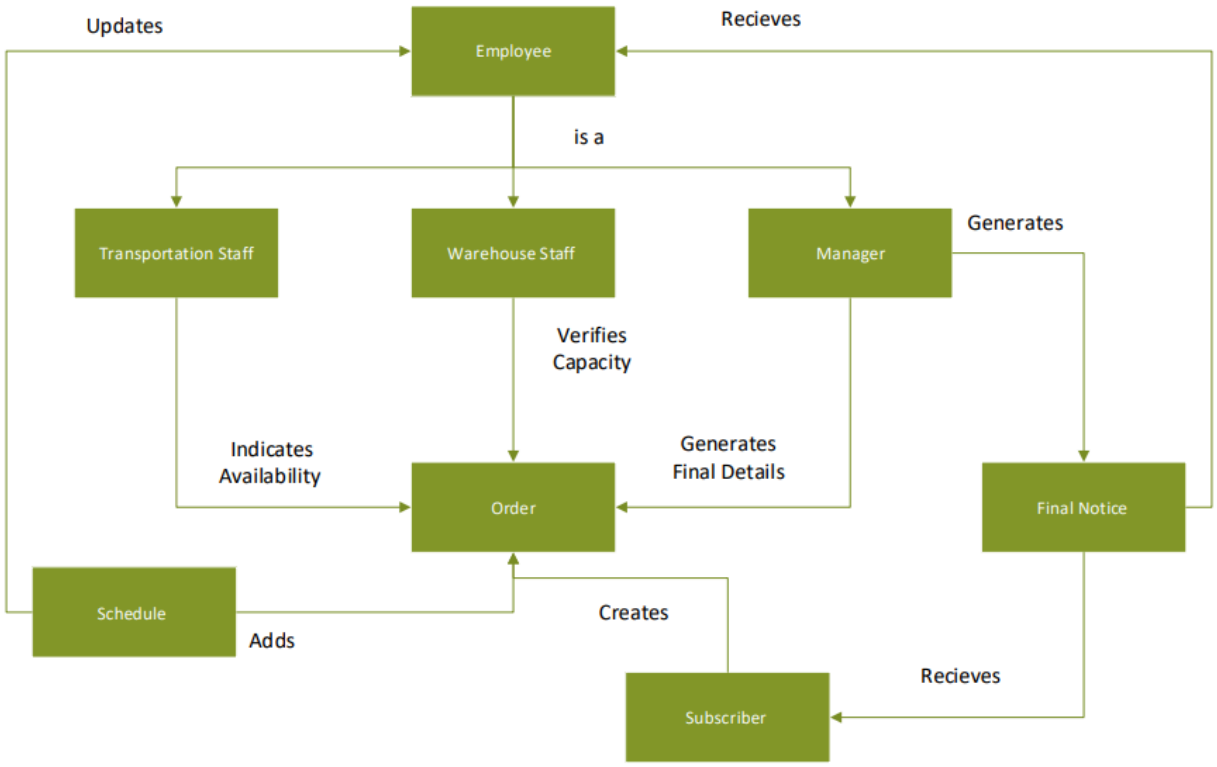
Figure 10

Section 11 Object-Oriented Analysis

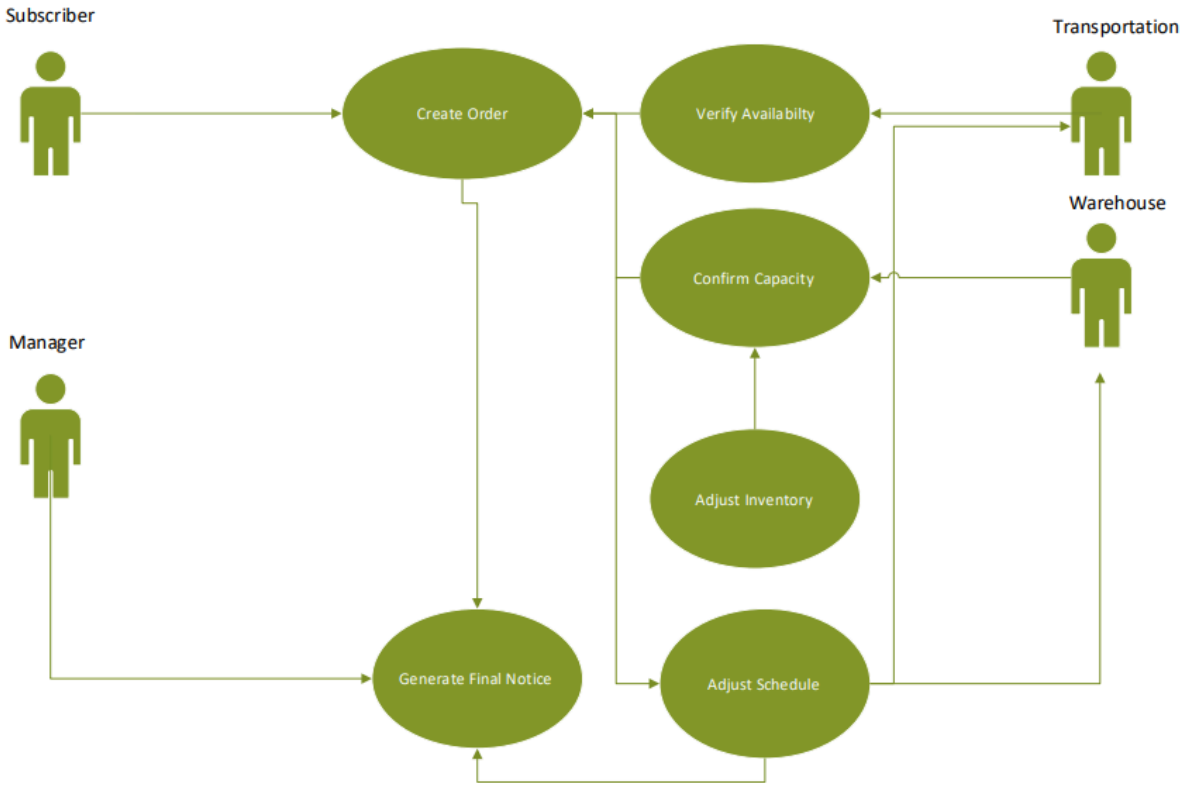
11.1 System Objects, Attributes and Methods



11.2 Object Relation Diagram



11.3 Use Case Diagram



11.4 User Cases and Description

Name	CreateOrder
Actor	Subscriber
Description	1. Login in with credentials 2. Input order details 3. Verify packaging requirements 4. Upload confirmation 5. Submit order
Precondition	Has an account, verified subscriber
Postcondition	Order is submitted for confirmations

Name	AcceptAssignment
Actor	Transportation Staff
Description	1. Receive assignment notice 2. Confirm availability 3. Accepts assignment
Precondition	Verified employee
Postcondition	Schedule update notice
Assumption	Not scheduled for any other job at request date

Name	DeliveryConfirmation
Actor	Transportation Staff
Description	1. Verify ProductID 2. Get recipient’s signature 3. Confirm delivery
Precondition	Transportation List

	Ready vehicle
Postcondition	Confirmation delivery notice

11.5 User Case Diagram

Order Verification

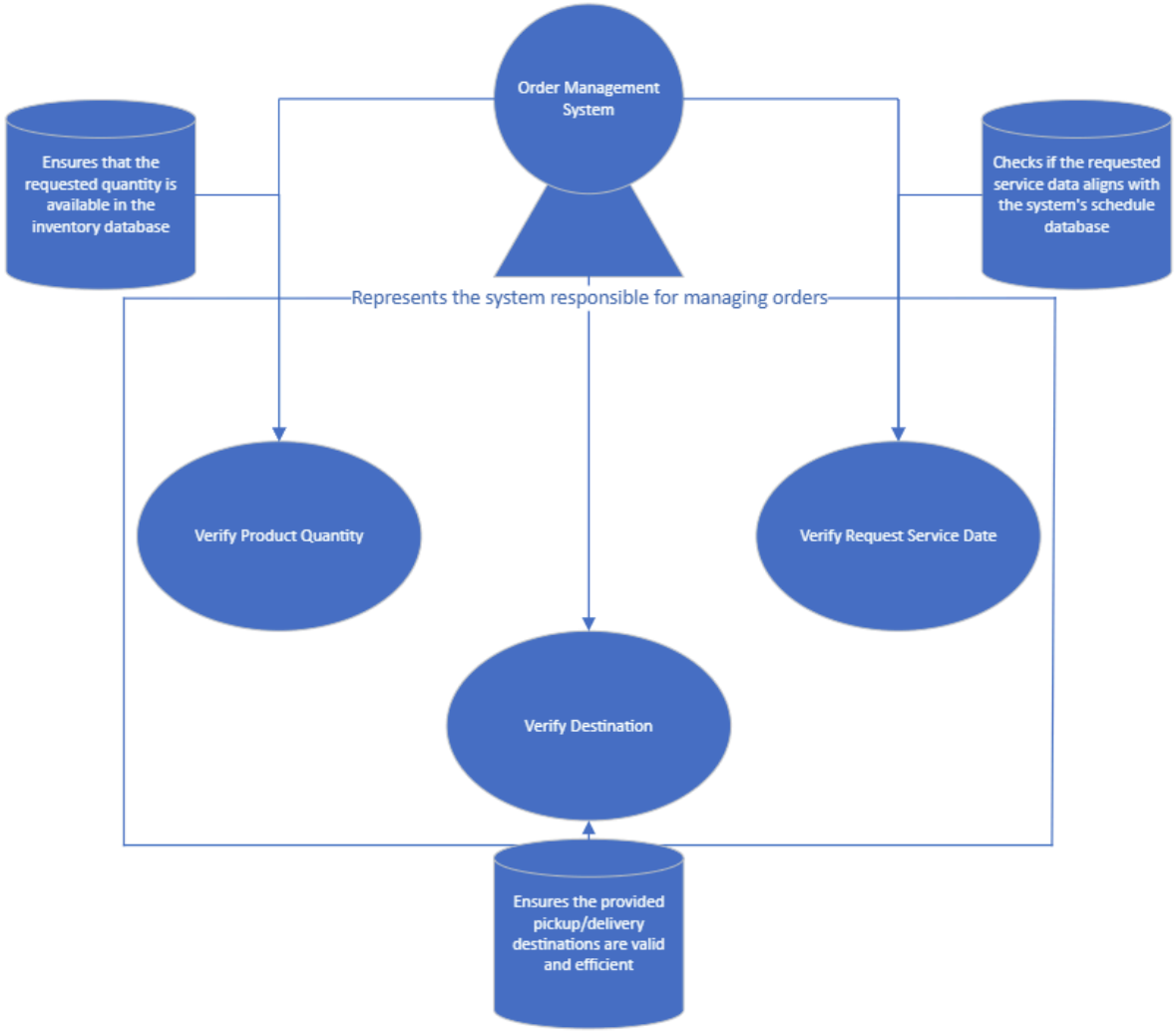


Figure 11.5

11.6 Sequence Diagrams

Product Verification

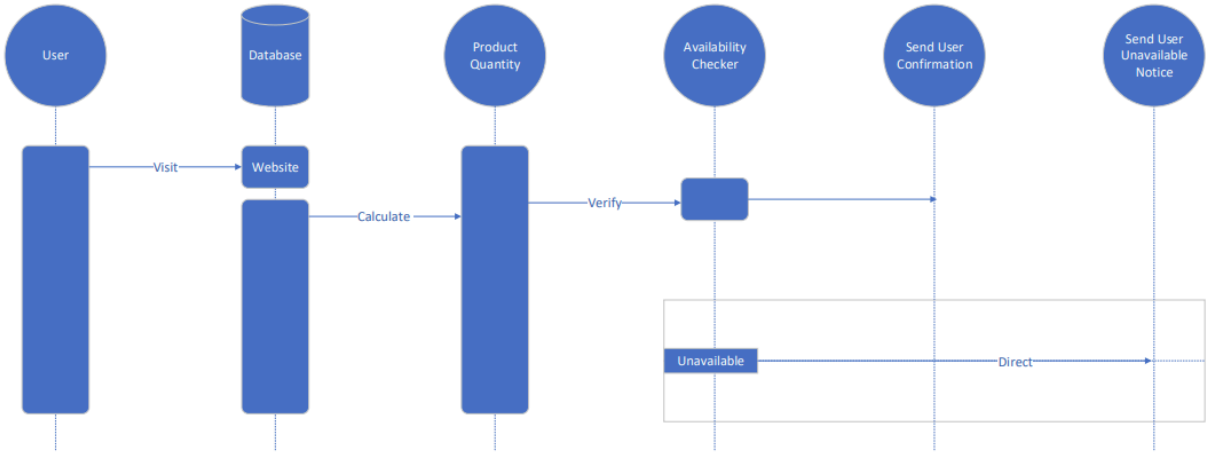


Figure 11.6

Figure 11.6:

Sequence Diagram shows the process interaction arranged in a time sequence.

- User would include product_id by input from the User.
- Database include the website in which the User inputs the needed information
    - Calculates the Quantity
- Availability Checker
    - Verify that the product is in stock
- Which then sends User Confirmation or an Unavailable Notice

11.5 State Transition Diagrams

Online Payment Transactions

Figure 11.7

Figure 11.7:

Payment Transactions involve collecting various pieces of information, including Full Name, Credit Card Number, Expiration Date, and CVV, to complete a purchase. Once this information

is provided, the User is prompted to select a type of delivery, either Standard or Expedited (with additional fees). Upon confirming the order, the system verifies all entered information for accuracy. If the transaction is approved, the User receives a confirmation; if denied, the system alerts the User to any errors in the provided information.

11.5 Activity Diagram

Supply Chain

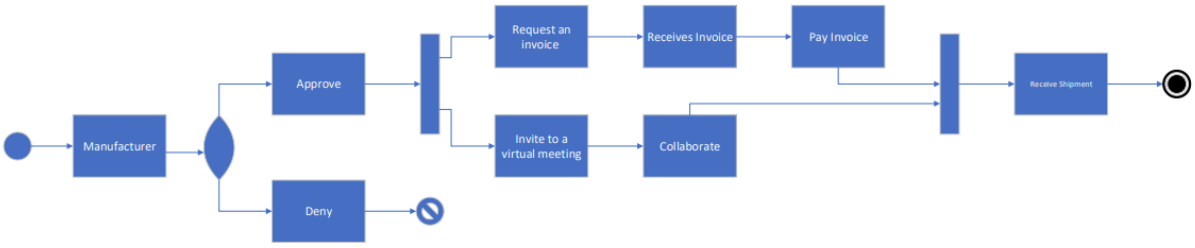


Figure 11.8

Figure 11.8:

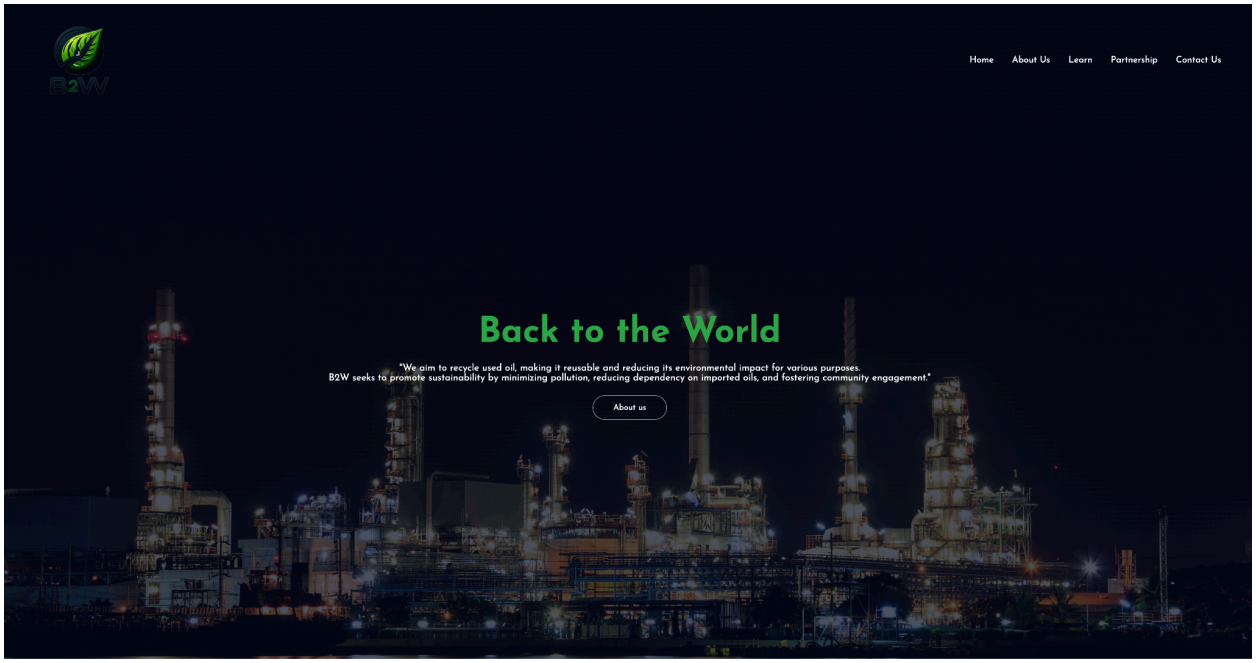
This Activity Diagram illustrates the process of accepting or denying a manufacturer and receiving shipments. Once a manufacturer is chosen, they are either approved or denied. If approved, the process splits into two pathways. The first involves requesting an invoice, receiving it, and then proceeding to pay the invoice. The second path leads to an invitation for a virtual meeting, which then moves into collaboration. The process concludes with the factory receiving the shipment.

Section 12 System Design Specification

12.1 Executive Summary

Our System requirement document defines and illustrates the internal and external entities of our Information System and how they function and interact. To better understand the flow of these activities, we displayed our User Interface and created an Entity Relationship Diagram, Test Plan, and provided User Stories, Training Plans, and Online Documentation that demonstrate the design and flow of how data flows through our system and how to interact with it.

12.2 User Interface



Website

With a minimalistic and open view of the home page, it is easier for the user to follow through and reduce any confusion where to start. Starting from our mission statement and menu button on the top which will be highlighted when the user is hovering over the buttons. There are still small adjustments but the menu button include:

- Home
    - By clicking on this button, it will automatically direct the user to the front page of the website
- About Us
    - The user will be able to view our mission statement and add information about our company and more.
- Learn
    - We will display all sorts of information on how to properly dispose of oil and more.
- Partnership
    - This button will have information about how to join our cause and along with creating an account. Though this can be a button itself, we will work on that soon.
- Contact US
    - Which will display our company address, email, and phone number for anyone who is interested in disposing of a large amount of oil or just to ask a question.

12.3 Online Documentation

1. FAQ (Frequently Asked Questions)
    1. How can I schedule a service appointment?
        a. You can schedule a service appointment by logging into your account and selecting the "Schedule Service" option from the menu. Follow the prompts to choose a convenient date and time for your appointment.
    2. How do I track the status of my service request?
        a. To track the status of your service request, navigate to the "Service Requests" section of your account dashboard. Here, you'll find updates on the progress of your request, including appointment details and technician assignments.
    3. What payment methods are accepted?
        a. We accept all major credit and debit cards for payment, including Visa, Mastercard, American Express, and Discover. You can securely enter your payment information during the checkout process.

2. Menu Navigation
    1. Home
        a. Access the main dashboard for your account
    2. Schedule Service
        a. Book an appointment for appliance repair or maintenance
    3. Service Requests
        a. View and track the status of your service requests

4. My Profile
    a. Update your contact information, preferences, and payment methods
5. FAQs
    a. Find answers to commonly asked questions about our services and policies
6. Contact Us
    a. Reach out to our customer support team for assistance

3. Pick Lists

1. Service Type
    a. Choose from repair, maintenance, installation, or diagnostic service options
2. Preferred Appointment Time
    a. Select morning, afternoon, or evening time slots for your service appointment
3. Payment Method
    a. Pick your preferred payment method from the list of accepted options

4. Explanations

1. Service Requests
    a. This section displays a list of all your past and pending service requests, along with details such as appointment dates, technician assignments, and status updates.
2. My Profile

a. Update your personal information, including your name, address, phone number, and email address. You can also manage your communication preferences and save payment methods here.

3. Contact Us
    a. If you have any questions or need assistance, feel free to reach out to our customer support team via phone, email, or live chat.

5. Exceptions and Errors

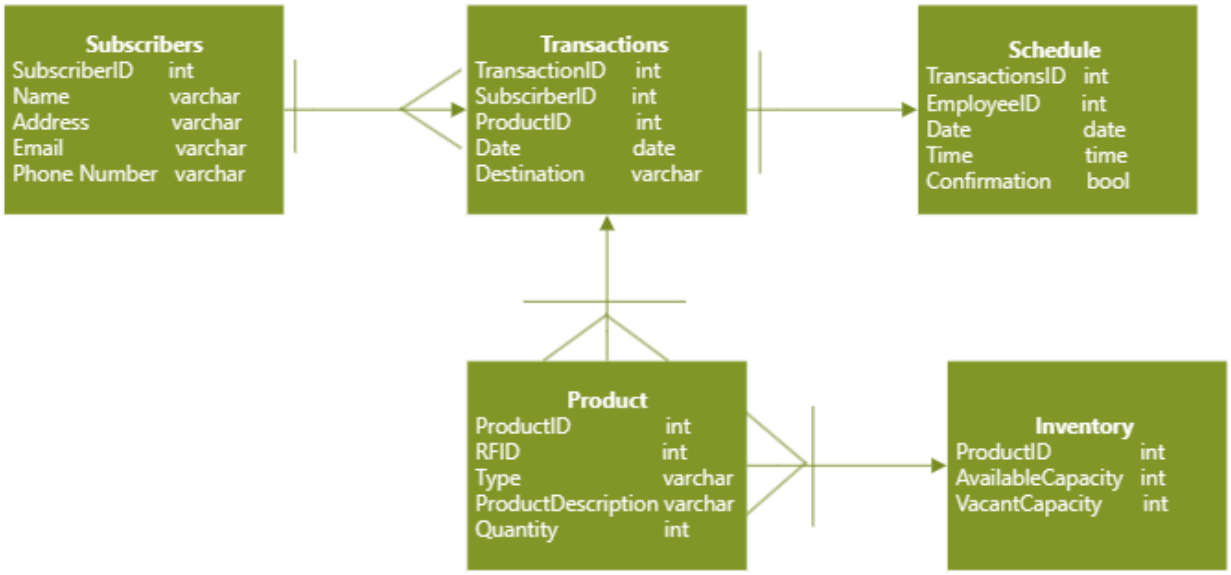
1. Appointment Conflict
    a. If there is a scheduling conflict for your desired appointment time, you'll receive an error message prompting you to choose an alternative time slot.
2. Payment Declined
    a. If your payment method is declined during checkout, you'll be notified immediately and prompted to provide valid payment information.
3. Service Unavailable
    a. In rare cases where a specific service is unavailable, you'll receive a notification informing you of alternative solutions or next steps.

6. Where to Find Help

1. Customer Support
    a. For immediate assistance, please contact our customer support team at support@b2wfuel.orgor call us at 1-900-789-4561. Our support

representatives are available 24/7 to assist you with any questions or concerns.

12.4 Entity Relationship Diagram



The ERD shows the relationship between the databases in our system:

Subscriber 1:M Transactions

Schedule 1:N Transactions

Transaction M:1 Products

Inventory M:N Products

12.5 Test Plan

1. Introduction

   This document outlines the testing procedure for the B2W Waste Management System. The scope of this testing includes: Transaction processing, Schedule process, Order Assignments and Inventory Management.

2. Objective

   The B2W SRD, describes the data flow of the system and the entities involved. This plan ensures that the features of the system meet the system requirements and perform properly. Defects or errors will be reported to improve the quality of the system.

3. Testing Approach
   a. Functionality
      i. Validate input and output data formatting
      ii. Test forms, buttons, links and web page features
      iii. Evaluate UI design and useability
   b. Performance
      i. Assess the system responsiveness, resource usage and scalability
   c. Security
      i. Identity vulnerabilities and potential threats

ii. Perform penetration testing, authentication testing, and authorizations testing.

4. Test Case
    a. Test Case ID: TC_Login
        i. Precondition: Accessible web application and login page
        ii. To verify that users are able to login to the web application successfully using valid credentials and MFA
    b. Test Case ID: TC_Make an Order
        i. Precondition: Verified user account
        ii. To verify that users are able to schedule an order and receive and confirmation status of their order
    c. Test Case ID: TC_Confirm Order
        i. To verify that the valid data from web application is receivable and make appropriate server requests
    d. Test Case ID: TC_Inventory Adjustment
        i. To verify that once an order has been made, the inventory is accurately evaluated, adds the product to the inventory, and update the inventory quantity
    e. Test Case ID: TC_Schedule Update
        i. Precondition: confirmed ordered and confirmed personnel
        ii. To verify that once the order has been assigned, the schedule is updated and sends a notice to the employee and status update to the user’s account.

5. Test Schedule
    a. Test Planning Phase (Week 1-2
        i. Develop test plan document outlining testing objectives, scope, approach, and schedule
        ii. Identify test requirements, including hardware, software, and test data
        iii. Define test strategies and methodologies for functional, performance, security, and usability testing
    b. Test Preparation Phase (Week 3-4)
        i. Set up a test environment including hardware, software, and network configurations
        ii. Prepare test data and scenarios based on requirements and user stories
        iii. Develop test cases, scripts, and procedures for each test scenario
        iv. Review and validate test cases with stakeholders to ensure alignment with requirements
    c. Test Execution Phase (Week 5-7)
        i. Execute test cases according to test plan and schedule.
        ii. Conduct functional testing to validate system behavior against requirements.
        iii. Perform performance testing to assess system scalability, response time, and resource utilization.

iv. Conduct security testing to identify vulnerabilities and ensure data protection.

v. Execute usability testing to evaluate user interface design and user experience.

d. Defect Management Phase (Ongoing)

i. Log defects and issues discovered during testing in a defect tracking system

ii. Prioritize defects based on severity and impact on system functionality

iii. Collaborate with the development team to resolve defects and retest fixes

6. Risk/Mitigation

a. Risk: Unexpected changes in requirements or design

i. Mitigation: Regular communication with stakeholders to capture changes and update test cases accordingly

b. Risk: Performance degradation under heavy traffic load

i. Mitigation: Conduct thorough performance testing to identify bottlenecks and optimize system performance

7. Reporting

a. Generate test reports summarizing test results, findings, and metrics.

b. Communicate test status, progress, and any issues or risks to project stakeholders.

12.6 User Story

As a registered user, I want to be able to log in to my account so that I can access my personalized information.

Given

- The user is on the login page

When

- The user enters a valid email address and password

Then

- The system verifies the credentials and redirects the user to the dashboard page

And

- The user's name is displayed on the dashboard indicating a successful login

And

- The user has access to their account information and settings

12.7 User Training Plan

1. Training Objectives
    a. Familiarize users with the layout and navigation of the B2W website.
    b. Provide an overview of key features and functionalities available on the website.
    c. Educate users on how to perform common tasks, such as browsing products, placing orders, and accessing support resources.
    d. Ensure users understand security measures and best practices for protecting their account information.
    e. Empower users to leverage advanced features for enhanced productivity and user experience.

2. Training Content
    a. Website Overview
        i. Introduction to the B2W website and its purpose.
        ii. Navigation of the homepage, product categories, and other sections.
        iii. Accessing important links, such as About Us, Contact Us, and FAQs.
    b. Product Browsing and Search
        i. How to search for products using keywords, categories, and filters.
        ii. Browsing product listings and viewing detailed product information.

c. Ordering Process
    i. Placing orders, including selecting products, specifying quantities, and providing shipping information.
    ii. Payment options available and steps to complete the checkout process.
    iii. Order confirmation and tracking.

d. Account Management
    i. Creating a user account and logging in.
    ii. Managing account settings, such as profile information and preferences.
    iii. Password management and security tips.

e. Support and Resources
    i. Accessing customer support channels, including FAQs, knowledge base, and contact information.
    ii. Troubleshooting common issues and seeking assistance when needed.
    iii. Exploring additional resources, such as product manuals, guides, and tutorials.

3. Training Methodology
    a. Interactive demonstrations
        i. Utilize screen sharing and live demonstrations to walk users through various aspects of the website.
    b. Hands-on practice
        i. Provide users with opportunities to interact with the website interface and perform tasks under supervision.

4. Training Schedule
    a. Initial training sessions for all users upon the launch of the website.
    b. Ongoing training sessions for new hires or users who require additional assistance.
    c. Refresher courses and updates on new features as needed to ensure continuous learning and optimization of user skills.

Section 13 Appendix

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