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# **Software Requirements Specification**

**for**

# **Online Shopping System**

**Version 1.0 approved**

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# 1. Introduction

## 1.1 Purpose

The purpose of this software is to create a comprehensive **online shopping application** that streamlines the shopping, management, and delivery processes for three distinct user roles: **Admin**, **User**, and **Supplier**.

*The system aims to achieve the following:*

### 1. **Admin Dashboard:**

- Allow administrators to manage products, users, and suppliers effectively.
- Provide tools to add, update, and delete products.
- Enable user and supplier account management for better control over system participants.

### 2. **User Dashboard:**

- Facilitate users in browsing, selecting, and purchasing products seamlessly.
- Display available products with relevant details like price and description.

### 3. **Supplier Dashboard:**

- Enable suppliers to view purchased products assigned to them.
- Allow suppliers to manage and update the delivery status of those products.

By addressing these roles, the application provides an integrated solution for managing the lifecycle of online shopping transactions, from product addition to purchase and final delivery. This enhances user satisfaction, simplifies administrative tasks, and ensures timely product delivery by suppliers.

## 1.2 Document Conventions

This document follows the following conventions for clarity and uniformity:

### 1. **Formatting Conventions:**

- *Bold Text:* Used for section headings and emphasis on important terms.
- *Italic Text:* Used for examples or emphasis within the text.
- *Monospace Text:* Used for code snippets, file names, or commands.

### 2. **Numbering:**

- Major sections are numbered as 1, 2, 3, etc.
- Subsections are numbered hierarchically as 1.1, 1.2, 2.1, 2.2, etc.

### 3. **References:**

*All references to external documents, tools, or libraries are cited in the References section with a unique identifier (e.g., [Ref-1]).*

### 4. **Terminology:**

- **Admin:** Refers to the administrator who manages users, products, and suppliers.
- **User:** Refers to the customer using the application to browse and buy products.
- **Supplier:** Refers to the entity responsible for delivering purchased products.
- **Dashboard:** Refers to role-specific interfaces (Admin Dashboard, User Dashboard, Supplier Dashboard).

### 5. **Units:**

- Time is specified in seconds or minutes.
- Currency values are expressed in Sri Lankan Rupees (LKR).

### 6. **Icons and Symbols:**

*Icons are used within the application for intuitive navigation and are referenced by name (e.g., **Cart Icon**, **Add Product Icon**).*

### 7. **Abbreviations:**

- **DB:** Database
- **UI:** User Interface
- **API:** Application Programming Interface

*This standardized format ensures consistency and ease of understanding across all stakeholders involved in the project.*

## 1.3 Intended Audience and Reading Suggestions

*This document is intended for the following audiences:*

### 1. Primary Audiences

#### 1. **Developers:**

- *Responsible for implementing the system's features as described in the SRS.*
- *Suggested Sections to Read:*
  - Section 2: Overall Description
  - Section 3: Specific Requirements
  - Section 4: External Interface Requirements

#### 2. **Testers:**

- *Validate that the system meets the requirements and functions as expected.*
- *Suggested Sections to Read:*
  - Section 3: Specific Requirements
  - Section 5: Nonfunctional Requirements

#### 3. **Project Managers:**

- *Oversee the development process, resource allocation, and deadlines.*
- *Suggested Sections to Read:*
  - Section 1: Introduction
  - Section 2: Overall Description
  - Section 5: Nonfunctional Requirements

#### 4. **Stakeholders (e.g., Clients, Product Owners):**

- *Understand the scope, features, and purpose of the application.*
- *Suggested Sections to Read:*
  - Section 1: Introduction
  - Section 2: Overall Description

### 2. Secondary Audiences

#### 1. **UI/UX Designers:**

- *Responsible for designing user-friendly interfaces based on system requirements.*
- *Suggested Sections to Read:*
  - Section 4.1: User Interfaces

### Reading Suggestions

- **For technical teams:** *Focus on functional and non-functional requirements for development and testing.*
- **For non-technical stakeholders:** *Focus on the introduction and overall description to understand the project scope and purpose.*

This segmentation ensures that each audience can efficiently access the sections most relevant to their role in the project.

## 1.4 Project Scope

The project aims to develop a comprehensive **Online Shopping Application** with three distinct dashboards to cater to administrators, users, and suppliers. The system will streamline product management, purchasing, and delivery processes.

### Core Functionalities

#### 1. Admin Dashboard:

- Add, update, and delete products.
- Manage user accounts, including adding, updating, and removing users.
- Add and manage supplier accounts to ensure delivery operations.
- Generate and view reports on sales and user activity.

#### 2. User Dashboard:

- View products added by the admin, with details such as price and description.
- Add products to a shopping cart and proceed to checkout.
- Track order status after purchase.

#### 3. Supplier Dashboard:

- View a list of products purchased by users.
- Update the delivery status of assigned products.

### Goals

- To provide a seamless shopping experience for users.
- To simplify product, user, and supplier management for administrators.
- To enable suppliers to efficiently handle deliveries.

### Key Features

- Role-based access control ensuring each user type has specific functionalities.
- A secure login and authentication system for all users.
- A responsive and user-friendly interface for all dashboards.
- Integration with a payment gateway for user purchases.
- A reporting system for the admin to analyze sales and user activities.

### Limitations

- The system focuses on desktop environments and does not include mobile compatibility.
- Inventory tracking is outside the scope of this project.

### Benefits

- Enhances user convenience with an intuitive shopping interface.
- Reduces administrative workload through centralized product and user management.
- Improves delivery efficiency by providing suppliers with clear order details.

The project aims to deliver a reliable and scalable solution for online shopping, suitable for small to medium-sized businesses.

## 1.5 References

The following references were used to define the requirements and guidelines for this project:

### 1. Standards and Guidelines

IEEE 830-1998: *Recommended Practice for Software Requirements Specifications*.

### 2. Technical Documentation

- *MySQL Documentation*: <https://dev.mysql.com/doc/>
- *Java SE Development Kit (JDK) Documentation*: <https://docs.oracle.com/javase/>

### 3. Design References

- *Material Design Guidelines*: <https://material.io/design>
- *UI/UX Best Practices for E-commerce Platforms*

### 4. Third-Party Libraries/Tools

- *Hibernate ORM Documentation*: <https://hibernate.org/>
- *Apache Commons Libraries*: <https://commons.apache.org/>

### 5. Related Projects

*Case Studies on Online Shopping Systems: E-commerce Platforms Overview by Tech World Journal.*

### 6. Client Requirements

*Client-provided specifications for the Online Shopping Application.*

### 7. Additional Resources

- *TutorialsPoint: Java Desktop Application Development*: <https://www.tutorialspoint.com/>
- *Stack Overflow Discussions on Role-Based Access Control Systems.*

These references provided the foundational knowledge, tools, and design patterns required to develop the system and document its requirements.

## 2. Overall Description

### 2.1 Product Perspective

*The **Online Shopping Application** is a standalone desktop-based system designed to facilitate efficient shopping, product management, and delivery processes. It is a new product built from scratch and does not depend on any existing systems for its core functionality. However, it integrates with specific third-party services like payment gateways and external databases to enhance usability.*

#### System Context

##### 1. Admin Role:

- *Manages core components such as users, products, and suppliers.*
- *Operates as the primary authority in the system.*
- *The dashboard provides tools for inventory and user oversight.*

##### 2. User Role:

- *Acts as the primary consumer of the application.*
- *Accesses products for browsing and purchasing.*
- *Interacts with the system primarily through the product catalog and order placement.*

##### 3. Supplier Role:

- *Responsible for fulfilling orders made by users.*
- *Uses the dashboard to view and update delivery statuses.*

#### Integration Points

##### 1. Payment Gateway:

*Allows secure cash on delivery for users purchasing products.*

##### 2. Database:

*Centralized MySQL database for storing user data, product details, and order information.*

##### 3. Authentication System:

*Ensures secure login for all roles using hashed passwords and role-based access control.*

The system is designed to operate independently while leveraging external services for enhanced functionality, ensuring a seamless and efficient online shopping experience.



## 2.2 Product Features

The **Online Shopping Application** offers a variety of features tailored to the needs of administrators, users, and suppliers. Each feature is designed to provide an efficient, user-friendly experience for its respective role.

### 1. Admin Dashboard Features

1. Product Management:
  - Add, update, and delete product details (e.g., name, description, price, quantity).
  - Upload and manage product images.
2. User Management:
  - Add, update, and delete user accounts.
  - Assign roles and permissions to users.
3. Supplier Management:
  - Add, update, and delete supplier accounts.
  - Assign purchased products to specific suppliers for delivery.
4. Reporting and Analytics:
  - View and generate reports on sales, user activity, and product performance.
  - Monitor inventory levels and sales trends.
5. System Settings:
  - Configure platform settings, such as payment gateways and user notifications.

### 2. User Dashboard Features

1. Product Browsing:
  - View available products with details such as price, description, and stock status.
  - Search and filter products by categories or price range.
2. Shopping Cart:
  - Add products to the cart.
  - Update quantities or remove items from the cart.

3. Order Placement:
  - *Proceed to checkout and complete purchases using a payment gateway.*
  - *View order confirmation and receipt details.*
4. Order Tracking:
  - *Track the status of orders, from placement to delivery.*
5. Account Management:
  - *Update personal details and view purchase history.*

### **3. Supplier Dashboard Features**

1. Order Management:
  - *View assigned orders and their details (e.g., products, delivery address, and status).*
  - *Update the delivery status of orders (e.g., pending, in progress, completed).*
2. Notifications:
  - *Receive alerts for new assignments or updates on pending orders.*
3. Delivery Reporting:
  - *Generate and view reports on completed deliveries and pending tasks.*

### **4. Common Features**

1. Secure Login System:
  - *Role-based authentication for admins, users, and suppliers.*
2. Responsive Design:
  - *A user-friendly interface optimized for desktop usage.*
3. Error Handling:
  - *Display user-friendly error messages for failed actions.*

4. Search Functionality:
  - Global search feature for products, users, and orders (specific to each role).
5. Help and Support:
  - Access to FAQs and support contact for troubleshooting.

These features collectively ensure a robust and efficient system that caters to the needs of all stakeholders involved in the online shopping ecosystem.

## 2.3 User Classes and Characteristics

*The **Online Shopping Application** will have three primary user classes, each with distinct characteristics and roles within the system: **Admin**, **User**, and **Supplier**. These user classes will have specific permissions and functionalities based on their role. Below is a detailed breakdown of each user class and their characteristics.*

### 1. Admin

- **Description:** *The admin is the highest authority in the system, responsible for managing the entire platform. Admins oversee product listings, user and supplier accounts, and sales reports. They can perform any action within the system, including managing content and users.*
- **Key Characteristics:**
  - Full access to all functionalities and features within the system.
  - Ability to add, update, or delete products, users, and suppliers.
  - Can generate and view sales and activity reports.
  - Needs strong technical and operational knowledge to manage the platform.
  - Responsible for ensuring the system operates smoothly and securely.
- **Permissions:**
  - *Create, read, update, and delete (CRUD) operations on products, users, and suppliers.*
  - *Access to all reports and system settings.*

### 2. User

- **Description:** *The user is a customer who interacts with the system primarily for browsing products, placing orders, and managing their account details. They have limited access compared to the admin, focused on shopping and viewing their past orders.*

- **Key Characteristics:**

- Browses and searches for products on the platform.
- Adds items to the shopping cart and proceeds to checkout for purchasing.
- Can track order status and manage personal account details.
- May have a basic understanding of online shopping processes.
- Needs a simple, intuitive interface for navigating the platform.

- **Permissions:**

- View products, add them to the shopping cart, and proceed to checkout.
- View and update their account details (e.g., address, payment methods).
- Track order history and delivery status.

### 3. Supplier

- **Description:** The supplier is responsible for fulfilling orders placed by users. They manage deliveries and update the status of orders that have been processed and dispatched.

- **Key Characteristics:**

- Receives and processes orders assigned by the admin.
- Updates delivery status of products, ensuring timely fulfillment.
- Manages inventory levels based on order status.
- May have limited technical knowledge, focusing on order management and logistics.
- Needs access to the platform that allows viewing and managing order deliveries efficiently.

- **Permissions:**

- View assigned orders and their details (products, delivery addresses).
- Update the status of orders.
- Generate delivery reports and monitor order fulfillment.

## ➤ Summary of User Classes and Permissions

User Class	Key Responsibilities	Permissions
Admin	Manage products, users, suppliers, and reports.	Full CRUD on products, users, suppliers; access to all reports and settings.
User	Browse products, purchase items, track orders.	View products, add to cart, checkout, view account and order history.

<b>Supplier</b>	Manage and deliver products ordered by users.	View orders assigned, update delivery status, generate reports.
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## 2.4 Operating Environment

The **Online Shopping Application** will operate in a controlled desktop environment, optimized for performance, reliability, and ease of use. Below are the details of the required operating environment for the application, including hardware and software specifications.

### 1. Hardware Requirements

The application is designed to run on desktop computers with the following minimum and recommended hardware configurations:

#### Minimum Hardware Requirements:

- **Processor:** Intel Core i3 or equivalent
- **RAM:** 4 GB
- **Storage:** 2 GB of available hard disk space
- **Display:** 1280 x 720 resolution
- **Input Devices:** Keyboard and Mouse
- **Operating System:** Windows 7 or later, macOS 10.10 or later

#### Recommended Hardware Requirements:

- **Processor:** Intel Core i5 or equivalent
- **RAM:** 8 GB or higher
- **Storage:** 5 GB of available hard disk space
- **Display:** 1920 x 1080 resolution or higher
- **Input Devices:** Keyboard and Mouse (Touchscreen for touch-enabled devices is optional)
- **Operating System:** Windows 10 or later, macOS 10.15 or later

### 2. Software Requirements

The software environment for the application will be compatible with major operating systems and is designed to run with the following requirements:

#### Operating Systems:

- **Windows:** Windows 7, Windows 10, Windows 11
- **macOS:** macOS 10.10 (Yosemite) or later
- **Linux:** Ubuntu 20.04 or later (for testing purposes)

**Required Software Components:**

- **Java Development Kit (JDK):** *JDK 11 or later for running the backend of the application.*
- **MySQL Database:** *Version 5.7 or later for data storage and management.*
- **IDE/Editor:**
  - *IntelliJ IDEA, Eclipse, or NetBeans (for Java development)*
  - *MySQL Workbench or any SQL editor for database management*

**Additional Software/Plugins:**

- **Apache Tomcat** *or other Java application servers for deployment (optional, depending on architecture).*
- **External Libraries:**
  - *Hibernate for Object-Relational Mapping (ORM)*
  - *Apache Commons Libraries for utilities*

**Browser Compatibility (For Admin Web Panel or Reporting):**

- **Chrome:** *Latest stable version*
- **Firefox:** *Latest stable version*
- **Edge:** *Latest stable version*

### **3. Network Requirements**

**Local Network:**

- *Local area network (LAN) for connecting to the database and server in a closed environment.*
- *Ethernet or Wi-Fi connection with a stable and fast internet connection is recommended for accessing the platform (if applicable).*

**Internet Access:**

- *Required for payment gateway integration and occasional software updates.*

### **4. Security Considerations**

**Encryption:**

- *All user credentials and sensitive data will be stored using industry-standard encryption methods (e.g., AES-256, bcrypt for password hashing).*

**Firewall and Antivirus:**

- *Ensure that desktop machines are equipped with firewall and antivirus software to protect against unauthorized access and malware.*

**Backup:**

- *Regular backups of the database and product-related data to prevent data loss.*

The system is designed to be flexible, with minimal hardware requirements, while ensuring optimal performance and security in the operating environment. It will work seamlessly on both Windows and macOS platforms, and the use of Java ensures cross-platform compatibility.

## 2.5 Design and Implementation Constraints

The **Online Shopping Application** is subject to various design and implementation constraints that must be adhered to during development. These constraints ensure compatibility, performance, and maintainability of the system while balancing resource limitations.

### 1. Design Constraints

#### Platform Dependency:

- The application is a desktop-based solution and must be compatible with major operating systems (Windows, macOS, and Linux).
- UI design must ensure responsiveness to various screen resolutions and support accessibility standards.

#### User Interface Consistency:

- The design must provide a simple and intuitive user experience for all user classes (Admin, User, Supplier).
- Use consistent UI elements and layouts across the dashboards.
- Adhere to modern design principles, including clear navigation, readable fonts, and visual feedback for user actions.

#### Data Validation:

- Input fields across the system (e.g., product details, user registration, and order information) must validate data to ensure its correctness and integrity.
- Prevent duplicate entries in the database (e.g., duplicate products or users).

#### Role-Based Access Control (RBAC):

- Each user class (Admin, User, Supplier) must have restricted access to features based on their role.

#### Scalability Considerations:

- The application must be designed to handle an increasing number of products, users, and transactions without significant performance degradation.

### 2. Implementation Constraints

#### Development Environment:

- The application will be built using Java for the backend and MySQL for the database. Developers must use compatible IDEs and libraries.
- Integration with third-party libraries or APIs (e.g., for payment processing or notifications) must be compatible with the selected development stack.

**Hardware Limitations:**

- *The application must be optimized to perform well on systems with minimum hardware configurations (e.g., 4 GB RAM, basic processors).*

**Database Constraints:**

- *The database schema must follow normalization standards to avoid redundancy and ensure data integrity.*
- *Transaction handling must be implemented to avoid data corruption during concurrent operations (e.g., multiple users placing orders simultaneously).*

**Security Requirements:**

- *All sensitive data must be encrypted (e.g., user passwords, payment information).*
- *The system must protect against SQL injection, XSS, and other common vulnerabilities.*
- *Role-based permissions must be implemented securely to prevent unauthorized access.*

**Time and Budget:**

- *The development timeline and budget are limited, requiring efficient use of resources.*
- *Some advanced features (e.g., AI-based recommendations) may be deferred for future updates.*

**Payment Gateway Integration:**

- *Payment processing must adhere to Payment Card Industry Data Security Standard (PCI DSS) compliance.*
- *Only approved and compatible payment gateways can be integrated.*

**Delivery Management:**

- *Supplier dashboards must be able to handle dynamic updates to delivery statuses in real time, even under limited network connectivity.*

**Resource Constraints:**

- *A limited development team and technical resources mean the system must be modular and easy to maintain.*
- *Heavy reliance on open-source tools and libraries to reduce costs.*

**3. Technical Constraints**

**Programming Language:**

- *The backend must be implemented in Java, ensuring compatibility across different operating systems.*

**Database Constraints:**

- *Use MySQL for data storage, with structured tables and relationships to support transactional consistency.*
- *Database queries must be optimized for speed and efficiency.*



**Integration Constraints:**

- *Any external APIs (e.g., for notifications or delivery tracking) must be REST-compliant and provide necessary documentation.*

**Software Updates:**

- *The application should be designed to support future updates and feature expansions without major redesigns.*

By considering these constraints during the design and implementation phases, the project can ensure a functional, secure, and user-friendly application that meets the requirements of all stakeholders.

## ***2.6 User Documentation***

*The **Online Shopping Application** will provide comprehensive user documentation to assist different user classes (Admin, User, and Supplier) in understanding and efficiently using the system's features. The documentation will be designed to be simple, clear, and accessible to users with varying levels of technical expertise.*

### **1. Purpose of User Documentation**

The primary purpose of the user documentation is to:

- *Guide users on how to perform tasks and utilize the system's features.*
- *Minimize the learning curve for new users.*
- *Troubleshoot common issues and errors.*
- *Provide a reference for system policies and guidelines.*

### **2. Documentation Contents**

The documentation will include the following sections tailored to each user class:

#### **1. Introduction**

- *Overview of the application and its purpose.*
- *Explanation of user roles (Admin, User, Supplier).*
- *General navigation guide for the system interface.*

#### **2. Getting Started**

- *Steps to install and launch the application.*
- *System requirements and compatibility checks.*
- *Login instructions for each user class.*
- *Password recovery and account setup.*

### **3. Admin Documentation**

- **Product Management:**
  - *How to add, edit, or delete products.*
  - *Uploading product images and descriptions.*
- **User Management:**
  - *Adding and managing user accounts.*
  - *Assigning roles and permissions.*
- **Supplier Management:**
  - *Adding and managing suppliers.*
- **Reports and Analytics:**
  - *Generating and interpreting sales reports.*
  - *Viewing user and supplier activity logs.*

### **4. User Documentation**

- **Product Browsing:**
  - *How to search for and filter products.*
- **Shopping Cart:**
  - *Adding and removing items from the cart.*
  - *Checking out and making payments.*
- **Order Tracking:**
  - *Viewing order history and tracking deliveries.*
- **Account Management:**
  - *Updating account information and preferences.*

### **5. Supplier Documentation**

- **Order Management:**
  - *Viewing assigned orders.*
  - *Updating delivery status (e.g., "Processing," "Shipped," "Delivered").*
- **Delivery Reports:**
  - *Generating and reviewing delivery performance reports.*

### **6. Troubleshooting**

- *Common issues and solutions (e.g., login errors, payment issues).*
- *Steps to contact customer support for unresolved problems.*

### **7. Frequently Asked Questions (FAQs)**

- *Answers to common questions about the system's functionalities.*

### 3. Documentation Format

The documentation will be available in multiple formats to ensure accessibility and ease of use:

- **PDF Guide:** A downloadable document with detailed instructions and screenshots.
- **Online Help Section:** Accessible from within the application, providing context-sensitive help.
- **Video Tutorials:** Step-by-step video guides for common tasks (e.g., placing an order, adding products).
- **Quick Start Guide:** A one-page document summarizing key features and workflows

### 4. Updating and Maintenance

- The user documentation will be regularly updated to reflect system changes, new features, and user feedback.
- Updates will be communicated to users via email or in-app notifications.

By providing detailed and accessible documentation, the application ensures that all user classes can efficiently navigate and use the system, reducing the need for extensive training or technical support.

## 2.7 Assumptions and Dependencies

The development and successful operation of the **Online Shopping Application** rely on certain assumptions and dependencies. These must be considered during the design, development, and deployment phases to ensure smooth functionality and future scalability.

### 1. Assumptions

#### 1. User Access:

- All users (Admins, Users, and Suppliers) will have access to a computer or desktop device with the required specifications to run the application.
- Users will have basic technical knowledge to navigate the system, such as using a mouse, keyboard, and understanding common UI elements.

#### 2. Internet Connectivity:

- A stable internet connection will be available for users when needed, especially for real-time features such as updating product data, processing transactions, or delivery tracking.

#### 3. Data Accuracy:

- Users (Admins) will input accurate and complete information regarding products, users, and suppliers into the system.
- Suppliers will provide correct delivery updates, and Users will correctly provide shipping and payment information.

**4. Security:**

- *Users will handle their login credentials responsibly to maintain system security.*
- *The system assumes the server and database will be protected from unauthorized access through firewalls and other security measures.*

**5. Scalability:**

- *The application is designed to handle a medium-sized user base during the initial phase. Future scalability will require additional infrastructure upgrades if the user base grows significantly.*

**6. Legal Compliance:**

- *The system assumes that payment gateways and third-party integrations comply with local laws and regulations (e.g., PCI DSS compliance for payment processing).*

**7. Maintenance:**

- *Regular maintenance will be performed by a designated team to ensure that the application operates without issues and to apply updates or patches as needed.*

**2. Dependencies**

**1. Hardware Dependencies:**

- *The application requires desktop hardware that meets the specified minimum or recommended requirements (e.g., sufficient RAM, storage, and processing power).*

**2. Software Dependencies:**

- *Java Runtime Environment (JRE): Required for running the application.*
- *MySQL Database: The application relies on MySQL for managing data. Proper installation and configuration of the database server are necessary.*
- *Third-Party Libraries: The system depends on various Java libraries for features like ORM (e.g., Hibernate) and utility functions (e.g., Apache Commons).*
- *Payment Gateway API: Integration with a reliable payment gateway API for secure transactions is essential.*

**3. Network Dependencies:**

- *Real-time functionalities like order tracking and delivery updates require consistent internet connectivity.*
- *Servers hosting the database and application must have high uptime to prevent interruptions in service.*

**4. Third-Party Integrations:**

- *The application relies on third-party APIs for functionalities such as:*
  - *Notifications (e.g., email or SMS alerts for order updates).*

- *Payment processing via secure gateways.*
- *These APIs must remain functional and accessible.*

**5. Team and Resources:**

- *Development and maintenance teams must have the required skills to implement the application (e.g., Java programming, database management, UI design).*
- *Adequate resources (time, budget, and tools) must be available for development, testing, and deployment.*

**6. Regulatory Dependencies:**

- *The application must comply with data protection laws (e.g., GDPR for handling user data, if applicable) and e-commerce regulations in the operating region.*

By identifying these assumptions and dependencies, the development team can plan effectively to address potential risks and ensure the successful implementation of the **Online Shopping Application**.