MILITARY INSTITUTE OF SCIENCE AND TECHNOLOGY

Final SRS Document

CSE-320: Software Engineering Sessional

Group – A5

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1.Abstract

GreenBean Wraps: An eco-friendly packaging marketplace is a forward-thinking e-commerce platform dedicated to providing access to a wide array of environmentally sustainable packaging materials. Tailored for businesses and individuals seeking eco-conscious alternatives, this platform aims to minimize environmental impact by offering a diverse range of packaging solutions. The Software Requirements Specification (SRS) outlines the framework and functionalities of GreenBean Wraps, highlighting its commitment to fostering sustainability within the packaging industry.

This document serves as a comprehensive guide, detailing the platform's architecture, key features, and intended functionalities. It encompasses various aspects such as product listings, sustainability information, user access, navigation, and environmental impact tracking. Additionally, it elucidates the target audience, emphasizing the relevance of GreenBean Wraps to businesses looking to adapt eco-friendly packaging practices.

Primary stakeholders of this platform include businesses seeking sustainable packaging, environmental advocates, packaging suppliers, eco-conscious consumers, logistics companies, and sustainability consultants. GreenBean Wraps aims to bridge the gap between eco-friendly packaging demand and supply, catering to a diverse audience committed to reducing their ecological footprint.

2.Introduction

Greenbean Wraps is an e-commerce platform dedicated to eco-friendly packaging materials. It connects businesses and individuals with sustainable packaging options, reducing their environmental impact. This Software Requirements Specification (SRS) document provides a high-level overview of the project, outlining its purpose, scope, value, intended audience, intended use, and key definitions and acronyms. Additionally, a table of contents is included to aid in navigating this extensive document.

3.Literature Review

In their 2012 paper, Guirong Zhang and Zongjian Zhao address the pressing need for eco-friendly packaging solutions in logistics. The authors contextualize their work within global environmental challenges and growing packaging waste issues. They introduce the concept of

Green Logistics, aligning with existing literature emphasizing sustainability in supply chain practices.

Zhang and Zhao dissect the negative environmental impacts of packaging, echoing broader discussions on the ecological toll of conventional materials. Their definition of green packaging, rooted in the 4R1D principles, aligns with a growing body of literature promoting environmentally conscious packaging.

The paper proposes actionable strategies for both governments and enterprises, emphasizing the collaborative role of policy frameworks and corporate initiatives in fostering sustainable packaging practices. The authors' synthesis of strategies resonates with broader sustainability discussions, emphasizing the interconnectedness of environmental responsibility and business operations.

In summary, Zhang and Zhao's paper significantly contributes to the literature on green packaging management by providing a comprehensive framework for navigating the transition towards sustainable logistics and packaging practices.

4.User Requirement

a. **User Registration and Onboarding:**
  i. Users should find the registration process intuitive and straightforward.
  ii. Clear instructions should guide users through the registration steps.
  iii. Email verification should be quick and straightforward to ensure account security and legitimacy.

b. **Secure Account Management:**
  i. Users should have secure account management tools.
  ii. Password recovery mechanisms must be available for account retrieval.

c. **Customizable User Profiles:**
  i. Users should be able to personalize their profiles with features like avatars, status messages, and display names.
  ii. The platform should provide easy-to-use tools for profile customization.

d. Efficient Messaging:
   i. Messaging features should offer fast and efficient communication.
   ii. Users expect a seamless chat experience with minimal latency for effective communication.

e. Group Chat Functionality:
   i. Users should have the capability to create and participate in group chats effortlessly.
   ii. The platform's group chat features must be intuitive and user-friendly.

f. File Sharing Capability:
   i. Users should be able to securely share files within the chat system.
   ii. File-sharing tools should ensure privacy and security for shared documents.

g. Real-Time Notifications:
   i. Users anticipate receiving real-time notifications for new messages or updates.
   ii. Customizable notification settings should allow users to manage their preferences.

h. Message History Access:
   i. Users should have access to their message history for reference and review purposes.
   ii. The platform should offer easy ways to access and navigate message archives.

5. System Requirements:

a. Hardware Requirements:
   i. RAM: 16 GB for optimal performance during development and testing.
   ii. Virtual Memory Management (VMM): 16GB to support resource-intensive tasks.
   iii. Database Management: Allocate 16GB for efficient data handling and storage.
   iv. Storage (ROM): SSD storage ranging from 256GB to 512GB for quick data access and handling.
   v. Computers for Development: 3/4 computers capable of handling multitasking efficiently.

b. Software Requirements:

     i.   Development Environment (IDE):
           Examples: Visual Studio Code, JetBrains IntelliJ IDEA, Eclipse.

     ii.   Version Control System:
           Git for collaborative development and version control.

     iii.   Command-Line Interface (CLI) Tools:
           Necessary command-line tools for system maintenance and operations.

     iv.   Text Editor:
           Preferred text editor for coding and script editing.

     v.   Web Browser:
           Modern web browsers for testing and development purposes.

     vi.   Web Server:
           Select a reliable web server software for hosting the application.

     vii.   Database Management System (DBMS):
           Examples: MySQL, PostgreSQL, MongoDB (NoSQL) for data storage.

     viii.   Backend Frameworks:
           NodeJS or any suitable backend framework for server-side operations.

     ix.   Frontend Frameworks:
           ReactJS or any preferred frontend framework for user interface development.

     x.   CI/CD Tools:
           Implement tools for continuous integration and deployment.

     xi.   Additional Technology:
           Identify any specific additional tech required for project functionalities.

6.Functional and Non-Functional Requirement

Functional Requirements Specification

a) User Registration

Users, including businesses and individual consumers, will be able to create accounts on the platform. User registration is a fundamental aspect of the platform, allowing individuals and businesses to access its features and services. To achieve this specification

     i.   **Create User Registration Forms**: Need to develop user-friendly registration forms where users can provide essential information. These forms will include fields for name, email address, password, and any additional information necessary to set up their profiles.

ii. **Email Verification:** Implement an email verification process. After registration, users receive a verification email. Clicking on the verification link confirms their email address, enhancing the security and legitimacy of user accounts.

iii. **Profile Creation:** Once users complete registration and email verification, they will be directed to profile creation pages. Here, they can provide additional information such as shipping addresses (for businesses), and personal preferences (for individual consumers). Profile creation enhances the user experience and allows for more personalized interactions on the platform.

b) **Product Listings**

Suppliers will be able to list their eco-friendly packaging materials and products for display on the platform. This functionality enables suppliers to showcase their products to potential customers, enhancing the platform's product variety. To achieve this specification

i. **Supplier Dashboards:** Need to create dedicated dashboards for suppliers. These dashboards serve as their control centers where they can log in, manage their product listings, and view key performance metrics. Supplier dashboards provide a streamlined experience for suppliers.

ii. **Product Listing Forms:** Need to develop user-friendly product listing forms that suppliers can easily fill out. These forms will include fields for product names, descriptions, pricing, available quantities, and any additional information relevant to the products.

iii. **Image Uploads:** Need to enable image uploads for products. High-quality images play a crucial role in attracting customers. Suppliers will be able to upload images of their products to provide a visual representation for potential buyers.

c) **Customization and Ordering**

Customers will be able to customize and place orders for eco-friendly packaging materials. Customization and ordering functionalities empower customers to choose packaging materials that meet their specific needs. To achieve this specification

i. **Customization Options:** Need to offer an array of customization options that customers can select, such as product size, color, quantity, and any other relevant attributes. A user-friendly interface will guide customers through the customization process.

ii. **Shopping Cart:** Need to implement a shopping cart system. Once customers customize their desired products, they will be able to add these items to a shopping cart before proceeding to checkout. The shopping cart allows customers to review their selections and make changes before finalizing their orders.

iii. **Payment Processing:** Need to integrate secure payment processing methods. Payment options will also include major credit cards and digital payment methods. Payment processing will be encrypted and secure to protect customers' financial data during transactions.

d) **Educational Resources**
The platform will provide educational content about eco-friendly packaging materials. This educational component enhances user awareness and encourages informed, sustainable choices. To achieve this

i. **Content Creation:** Need to develop high-quality educational content, including articles, videos, infographics, and guides. These resources will cover a range of topics, such as the environmental impact of different packaging materials, the benefits of eco-friendly options, and tips for sustainable packaging practices.

ii. **Content Organization:** Need to create a dedicated section on the platform for educational resources. The content should be logically organized, making it easy for users to access and navigate through these valuable materials.

e) **User Reviews and Ratings**

Customers will be able to leave reviews and ratings for products. This functionality allows users to share their experiences and insights, helping others make informed choices. To make this specification work

    i. **Review Submission Forms:** Need to implement user-friendly forms for customers to submit reviews. These forms will include fields for ratings, comments, and optional image uploads. Customers should have the option to express their opinions and experiences with products.

    ii. **Rating Systems:** Need to develop a rating system that allows customers to rate products on a scale or provide feedback in a structured way. Display average product ratings alongside product listings to help potential buyers make informed decisions.

f) System Monitoring

Administrators should monitor the system's performance and resolve disputes. System monitoring ensures that the platform operates smoothly, and dispute resolution maintains a fair and positive user experience. To achieve this

    i. **Monitoring Tools:** Need to set up system monitoring tools to track key performance indicators. These tools should continuously monitor website traffic, user engagement, order processing times, and other critical metrics. Any anomalies or issues should trigger alerts for immediate attention.

    ii. **Admin Dashboard:** Need to create a dedicated admin dashboard that provides real-time data and analytics related to system performance. Administrators should have access to comprehensive information that enables them to make data driven decisions and respond promptly to any performance issues.

Non-Functional Requirements Specification

a) Performance

The system will provide a responsive user experience, with quick page loading times.
Ways to Provide Better Performance:

    i. **Caching Mechanisms:** Need to Implement caching mechanisms to store frequently accessed data temporarily. This reduces the need to retrieve data

from the database with every user request, leading to faster page loading times.

    ii. **Load Balancing:** Need to use load balancing techniques to evenly distribute incoming user traffic across multiple servers. This ensures that no single server is overwhelmed, maintaining fast response times even during peak usage.

b) Security

User data, including personal and financial information are securely stored and protected.

Ways to Provide Better Security:

    i. **Encryption:** Need to emmploy strong encryption protocols to secure data during transmission and while at rest. This ensures that user data, including personal and financial information, is protected from unauthorized access.

    ii. **Secure Authentication:** Need to implement secure authentication methods, such as multi-factor authentication (MFA), to verify the identity of users. This guards against unauthorized access to user accounts.

    iii. **Access Controls:** Need to set up access controls and permissions to restrict user access to specific data and functionalities. Only authorized individuals should have access to sensitive information.

c) Scalability

The platform will be designed to handle a growing number of users, products, and transactions.

Ways to provide Better Scalability:

    i. **Scalable Architecture:** Need to build the platform with a scalable architecture that can easily accommodate increased user loads and additional products. This will involve microservices, containerization, or serverless computing, allowing the system to expand as needed.

    ii. **Database Optimization:** Need to optimize the database design and structure to efficiently manage and retrieve data as the system

scales. Techniques such as sharding or distributed databases can be used to handle increased data volumes.

d) Usability

The platform should be user-friendly and intuitive, requiring minimal training for users.
Ways to provide Better Usability:

i. **User Interface Design:** Need to develop an intuitive and user-friendly interface. This includes well-organized layouts, clear navigation, and user-friendly design elements, making it easy for users to understand and use the platform.

ii. **User Testing:** Need to conduct user testing to gather feedback and refine the platform's usability. This iterative process ensures that user interfaces are optimized for user satisfaction and efficiency.

e) Availability

The platform should be available 24/7 with minimal downtime for maintenance.
Ways to provide better availability:

i. **Redundancy:** Need to implement redundancy in the system by using redundant servers, databases, and network components. This redundancy minimizes downtime in the event of hardware failures or other issues.

ii. **Failover Mechanisms:** Need to set up failover mechanisms that automatically switch to backup systems or servers in case of a failure. This ensures continuous availability and minimizes disruptions to users.

f) Response Time

The system should respond to user actions promptly, ensuring a seamless experience.
Ways To Provides Better Response Time:

i. **Optimization of Code:** Need to optimize the codebase for efficient execution continuously. This includes minimizing resource-intensive processes, reducing code bottlenecks, and ensuring that the code is well-structured for quick response to user actions.

ii. **Database Queries Optimization:** Need to optimize database queries to retrieve and update data efficiently. This may involve indexing, query caching, and other database performance optimizations to reduce query execution time.

7.System Architecture
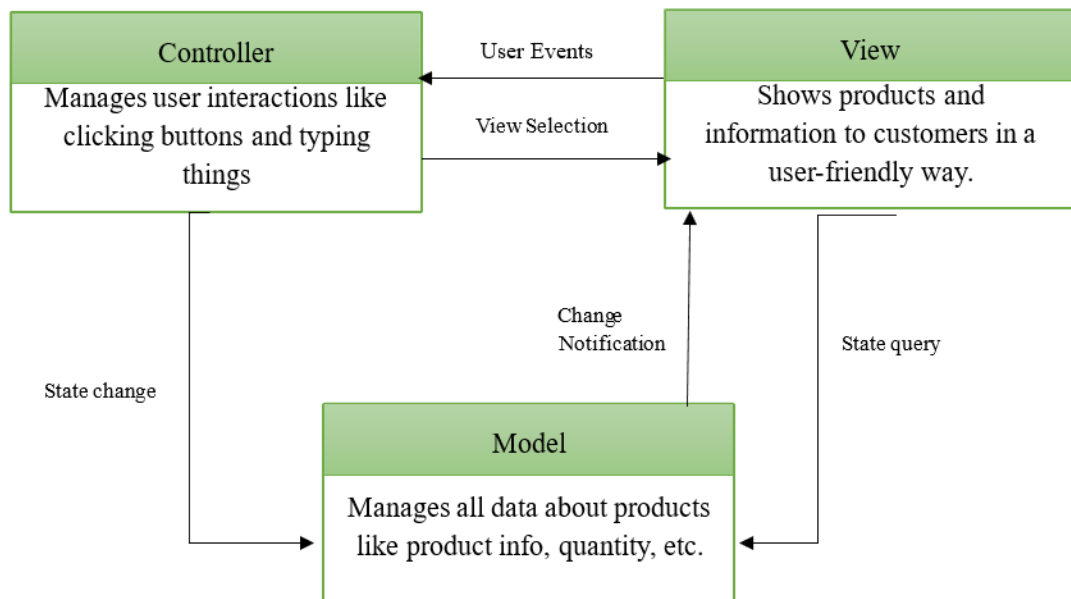
MVC (Model-View-Controller) offers significant advantages for our eco-friendly packaging marketplace:

a) **Structured Organization:** Divides into Model (data handling), View (customer presentation), and Controller (interaction management).

b) **Flexible Modifications:** Enables independent changes, ensuring alterations don't affect other parts inadvertently.

c) **Diverse User Experience:** Allows multiple ways for customers to view products, catering to different preferences.

d) **Readiness for Growth:** Easily adapts to future enhancements or new features without causing disruptions.

e) **Efficient Team Collaboration:** Facilitates seamless teamwork among various roles, fostering smooth project development.

In essence, MVC streamlines organization, modifications, customer experiences, future readiness, and team collaboration for our eco-friendly packaging marketplace.
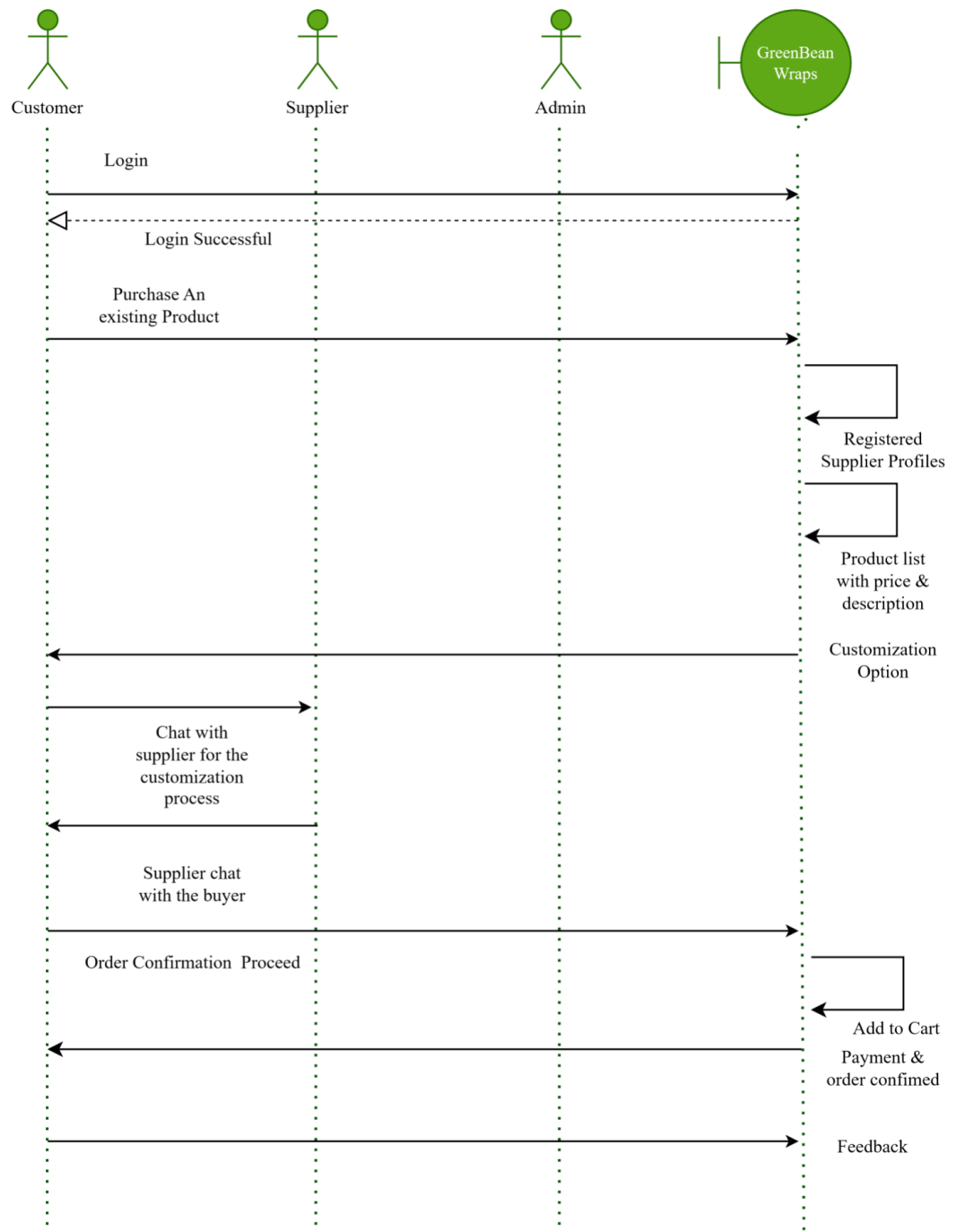
8.UML Diagram

a. Context Diagram
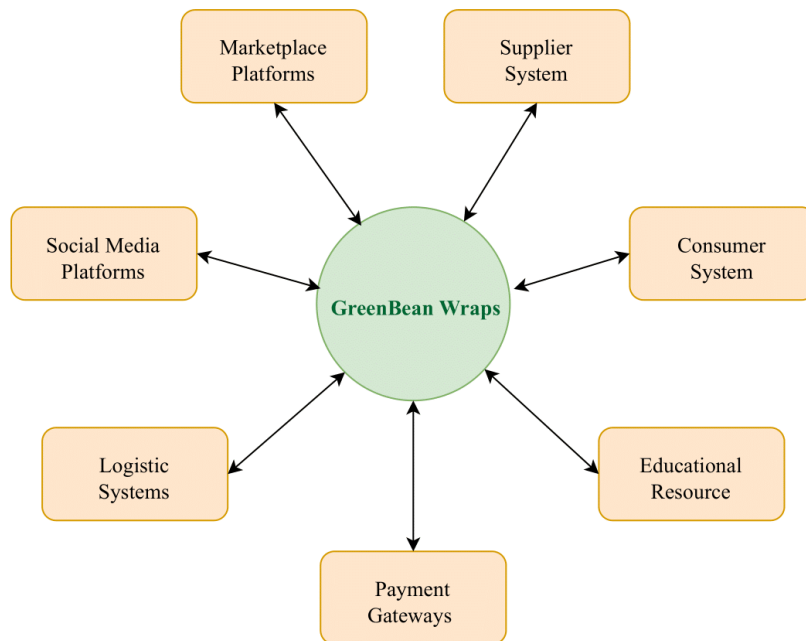
b. Use Case Diagram

c. Activity Diagram

9. Test Case Design

Test Scenario	Test Case ID	Test Case Description	Test Data	Steps to Execute	Expected Result
Verify Login	1	Enter valid ID and valid password	User ID: User_01 Password: 123456	1.Go to Login page 2.Enter User ID 3.Enter Password 4.Click Login	Login Successful
Verify Login	2	Enter valid ID and valid password	User ID: User_01 Password: 123	1.Go to Login page 2.Enter User ID 3.Enter Password 4.Click Login	Login Failed
Verify Login	3	Enter valid ID and valid password	User ID: iioo Password: 1290877	1.Go to Login page 2.Enter User ID 3.Enter Password 4.Click Login	Login Failed
Verify Login	4	Enter valid ID and valid password	User ID: User Password: 123456	1.Go to Login page 2.Enter User ID 3.Enter Password 4.Click Login	Login Failed
Environmental Impact	5	Verify display of accurate environmental impact	Sample product data	1.Navigate to a product page	Accurate display of environmental impact
				2.Check for eco-certifications and details	Clear presentation of certifications
				3. Confirm information on recyclability	Proper indication of recyclability
Catalog and Search Functionality	6	Test catalog diversity and search functionality	Various product data for different industries	1. Use the search and filter options	Accurate display of diverse products
				2. Filter by material type, size, and industry	Relevant products displayed based on filters
				3. Verify sorting options for price and rating	Proper sorting based on selected criteria
Catalog and Search Functionality	7	Test the sorting functionality based on popularity	Product data with varying popularity	1. Apply the popularity sorting option	Products are correctly sorted by popularity
				2. Verify the consistent display of popular products	Popular products are consistently displayed
				3. Confirm the sorting accuracy with changing popularity	Sorting dynamically adapts to popularity changes
Customization and Comparison	8	Test customization options and price comparison	Sample product data	1. Customize packaging in the shopping cart	Accurate customization and price comparison
				2. Compare prices and features with another item	Clear comparison between selected items
				3. Adjust quantities and review final selection	Accurate total cost with

					adjusted quantities
Customization and Comparison	9	Test customization options for unique product dimensions	Product data with non-standard dimensions	1. Customize packaging for a product with unique dimensions	Customization options accurately accommodate unique dimensions
				2. Confirm that the customized product is correctly added to the cart	Customized product is accurately added to the cart
				3. Verify the accurate display of customized product details	Customized details are correctly displayed
Order Management and Reviews	10	Test order management and customer reviews	Sample order and review data	1. Track orders and leave reviews	Successful order tracking and reviews
				2. Verify the display of order history and status	Clear and accessible order information
				3. Submit multiple reviews for the same product	System prevents duplicate reviews
Order Management and Reviews	11	Test the system's ability to handle a high volume of orders	Large dataset of orders and reviews	1. Add a large number of orders and reviews	System manages and displays large data volumes efficiently
				2. Confirm that the system maintains performance with the increased load	No significant degradation in system performance
				3. Test the display of historical orders with high volume	Historical orders are displayed without performance issues
Payment and Checkout	12	Test secure payment gateways and checkout process	Various payment options	1. Complete the checkout process	Secure payment and successful checkout
				2. Test different payment options	Successful completion with various options
				3. Intentionally provide incorrect payment details	System rejects incorrect payment information
Payment and Checkout	13	Test the platform's response to payment processing errors	Various error scenarios	1. Attempt to make a payment with an expired card	Platform displays an appropriate error message
				2. Test the response to a declined payment	Platform prompts the user with a declined payment message
				3. Verify system behavior with a server-side payment processing error	Platform provides a clear error message and does not proceed
Customer Support and Recommendations	14		Customer inquiry data	1. Contact customer support	Timely and helpful support response

		Test customer support channels and recommendations		2. Request recommendations for specific packaging	Accurate and relevant suggestions provided
				3. Check response time for inquiries	Quick and efficient response
Educational Resources	15	Verify accessibility and clarity of educational materials	Educational resource data	1. Access educational resources	Clear and accessible educational materials
				2. Navigate through sustainability guides	Information presented in an understandable way
				3. Confirm accessibility on different devices	Consistent access and clarity on all devices
Educational Resources	16	Test the availability of resources in multiple languages	Educational resource data in different languages	1.Access educational resources in a language other than English	Resources are accessible and clear in multiple languages
				2.Confirm the availability of sustainability guides in multiple languages	Guides are clear and well-presented in different languages
				3.Verify the consistency of information across different language versions	Information is consistent in different language versions
Comprehensive Catalog	17	Test catalog organization and detailed product info	Various product data	1.Browse through the catalog	Well-organized catalog with detailed info
				2. Verify the accuracy of product descriptions	Clear and informative product details
				3.Check for regular updates to the catalog	New and relevant products are added regularly
Comprehensive Catalog	18	Test the platform's ability to handle a large number of products	Large dataset of diverse product data	1.Add a significant number of new products to the catalog	Platform displays and handles a large number of products
				2. Verify that the catalog remains responsive with a large dataset	Catalog remains responsive without significant delays
				3. Confirm that the search functionality works efficiently with a large dataset	Search results are promptly retrieved and displayed
Supplier Profiles	19	Test accurate showcasing of supplier profiles	Supplier and review data	1. View supplier profiles and reviews	Accurate showcasing of supplier profiles
				2. Submit a review for a supplier	Review is displayed on the supplier's profile
				3. Check for consistency in supplier information	No discrepancies in displayed information

Mobile Responsiveness	20	Test responsiveness on various devices	Various devices and screen sizes	1. Access the platform on different devices	Consistent user experience on all devices
				2. Confirm navigation on mobile and tablet	User interface adapts appropriately
				3. Verify readability and functionality on each device	No issues with display or navigation

10.References

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