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TECHNOLOGY PROJECT NAME :

E COMMERCE PRODUCT PAGE

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Phase 1 – Problem Understanding & Requirements (Manual Notes – Expanded)

1. Problem Statement

In In today's digital world, customers expect a smooth online shopping experience. Businesses, especially small and medium enterprises, struggle to showcase their products effectively without depending on large e-commerce platforms like Amazon or Flipkart. Traditionally, products were sold in physical stores, advertisements, or through word of mouth. However, these methods limit customer reach and make it difficult to provide detailed product information, reviews, and digital transactions. Existing solutions such as Shopify or WooCommerce provide ready-made templates but often require paid subscriptions, technical skills, or lack customization for specific business needs. Many small businesses and students need a simple, customizable, and responsive product webpage that displays product details clearly and can integrate with backend APIs. The main challenges addressed are:

- User Experience - A clean, responsive UI for mobile and desktop.

- Dynamic Product Data - Products should load from an API instead of hardcoding.

- Cart Management - Items can be added/removed easily.

- Scalability - The system should handle multiple products and customers.

- Security - Safe handling of product and customer interaction data.

In short, the problem is the lack of a simple, reusable, and responsive e-commerce product page for small-scale use, and our solution is to create a dynamic webpage with REST API integration.

2. Users & Stakeholders

Any project should clearly define its users and stakeholders.

Primary Users

- Customers - Browse products, check price, description, and availability.
- Business Owners - Showcase their products online.
- Admins - Manage product data, pricing, and stock levels.
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Secondary Stakeholders
- Developers - Reuse the webpage design and APIs in other projects
- Organizations - Sell products online without investing in large platforms.
- Educational Institutions/Students - Use the system as a learning tool for e-commer ce and API integration.

Stakeholder Benefit Table User/Stakeholder Role Benefit from Product WebpageCustomer End User View products, add to cart, make buying decisions Business Owner Service Provider Display and promote products easily Admin Administrator Manage product catalog and stockDeveloperIntegrator Reuse webpage+API in other apps
Organization Vendor Maintain online presence Student/Institution Learner Understand practical e-commerce concepts
Thus, both end-users and backend stakeholders benefit from this webpage.

User/Stakeholder	Role	Benefit from API
Customer	End User	View product,addtocart, makebuying Decesion
Business owner	Service provider	Display and promote products easily
Admin	Administrator	Manage product catalog and stock

Developer	Integrator	Reuse webpage+API in other apps
Organization	Vendor	Maintain online presence
Student/ Institution	Learner	Understand practical e-commerce concepts

3. User Stories

User stories explain needs in simple language along with acceptance criteria.
As a customer, I want to view product details (name, image, price, description) so that I can decide whether to purchase.
Acceptance: Page must show accurate product details.
As a customer, I want to add a product to my cart so that I can buy it later.
Acceptance: "Add to Cart" should update cart instantly
As a developer, I want to access product data through REST API so that I can integrate it in mobile or web apps.

Acceptance: API must return JSON with product details.

4. MVP Features

The Minimum Viable Product (MVP) of the project includes:

- Product Display - Name, image, price, description.

- Add to Cart - Basic cart functionality (no payment integration).

- API Integration - Products fetched from a Node.js backend.

- Responsive Design - Works on both desktop and mobile devices.

Importance of MVP
Allows quick development of a working system.
Provides immediate value to customers and owners.
Can be extended later with features like login, payments, and analytics

5.Wireframes / API Endpoint List

Page are designed to provide a seamless user experience across all devices. The Home Page features a header with navigation, search bar, cart, and promotional banners. Product Listing Pages include filters, sorting options, and product cards with quick actions. The Product Detail Page showcases images, descriptions, reviews, and related items. The Cart and Checkout Pages offer clear summaries, editable quantities, payment options, and progress tracking. The Login/Signup and User Profile Pages provide easy access to authentication, account management, order history, and wishlist. The API Endpoint List complements these wireframes by enabling interaction with the backend. Key endpoints include /products for listing, /products/:id for details, / cart for managing cart items, / checkout for order processing, and /users for authentication and profile management. Together, the wireframes and API endpoints ensure a smooth, interactive, and responsive e-commerce experiences

End point	Method	Input	Output
/api/products	GET	None	Array of products
/api/products/:id	GET	Product ID	Product details
/api/cart	GET	JSON BODY	Success message
/api/products/:id/reviews		GET	GET
/api/products/:id/ reviews	POST	GET	GET

Product Page → Product Image | Title | Price | Description | Reviews | "Add to Cart" button. Cart Page → List of items with price summary and remove option. API Endpoint List (Node.js REST API) Endpoint Method Description Input Output /api/products GET Get all products None Array of products /api/products/:id GET Get product by ID Product ID Product details /api/cart POST Add product to cart JSON body Success message /api/cart GET Get items in cart None Cart items list Example Request (GET /api/ products) [{ "id": 101, "name": "Wireless Headphones", "price": 2499, "description": "Bluetooth 5.0, Noise Cancelling", "image": "headphones.jpg" }]

6. Acceptance Criteria

Acceptance criteria ensure system quality.
Functional Criteria

1.Product page must display all product details.
2.Cart should update instantly when items are added.
3.API must return co rrect product data in JSON.
4.Reviews and ratings must be visible.

Non-Functional Criteria

1.Page should load within 3 seconds.
2.Must support at least 100 simultaneous users.
3.Should be responsive across devices.
4.Error messages must be meaningful