

A Reel-Driven Handmade E-Commerce Application to Enrich Customer's Experience

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Abstract— Traditional e-commerce platforms relying on static imagery and textual descriptions fail to convey the craftsmanship and aesthetic appeal of artisanal goods. This paper presents FableCraft, an Android-based e-commerce application designed to redefine the digital retail experience for local artisans through dynamic multimedia storytelling. FableCraft integrates reel-style short product videos enabling immersive visual demonstrations that enhance customer engagement and product trust. The system leverages Firebase Authentication for secure role-based access, Firebase Realtime Database for real-time synchronization, and Firebase Storage for scalable multimedia management, with Razorpay ensuring secure online transactions. The application delivers a complete e-commerce workflow encompassing user registration, product categorization, cart management, checkout, and order tracking, supported by a dedicated Admin Dashboard. Evaluation results demonstrate measurable improvements in user engagement, product visualization quality, and transaction reliability compared to conventional platforms. FableCraft establishes a scalable and secure digital marketplace that bridges the gap between artisans and consumers, empowering local craftspeople to reach wider audiences while preserving the authenticity of every handcrafted product.

Index Terms— Android e-commerce, artisan marketplace, reel-style product videos, Firebase authentication, real-time database synchronization, multimedia storytelling, mobile commerce, Razorpay payment integration, handmade products, customer engagement.

I. INTRODUCTION

The global handicrafts market was valued at nearly USD 600 billion in 2024 and continues to grow, driven by consumer interest in authentic, ethical, and culturally meaningful products. Despite this rising demand, a large number of artisans—especially in emerging markets—are experiencing declining incomes and limited access to digital markets. This contradiction highlights a deeper structural problem in today's e-commerce systems. Mainstream online marketplaces such as Amazon and Flipkart are designed for mass-produced goods. Their algorithms prioritize scale, pricing, and sales volume, leaving little room for storytelling or cultural context. As a result, handmade products struggle to stand out and are often treated no differently from factory-made alternatives.

Artisans face three major challenges. First, visibility loss, where handcrafted products are buried among millions of listings and forced to compete mainly on price.

Second, cultural dilution, as standardized product templates fail to capture the heritage, techniques, and artisan identity behind each craft. Finally, discovery challenges arise because conventional recommendation systems cannot effectively support narrative-rich, low-volume products, making it difficult for buyers to find genuinely authentic crafts.

At the same time, consumer behaviour is changing. A growing segment of “conscious consumers” actively seeks products that reflect cultural value, authenticity, and social impact. However, existing digital marketplaces are not built to support meaningful artisan–consumer connections. Cultural commerce—where trade is driven by stories, heritage, and human relationships—remains an underexplored area. There is a clear need for platforms that combine functional e-commerce with cultural preservation and personalized discovery.

A. Research Gaps And Motivation

- **Static Product Presentation:** Traditional platforms rely on static images and text, insufficient to represent the craftsmanship and uniqueness of handmade products, with no dynamic content or personalized discovery mechanisms.
- **Recommender Systems Ignore Artisan Context:** Existing recommendation systems focus on commodity retail with dense user interactions, failing to address artisanal commerce constraints such as sparse transactions, low product volume, and high cultural variance.
- **Limited Multimedia Engagement:** Existing platforms lack reel-based product presentation features modern users prefer, reducing purchase confidence and customer engagement.
- **No Dedicated Artisan Platform:** General-purpose platforms generate no lasting artisan identity record, leaving smaller craftspeople unable to compete with large-scale commercial sellers.

II. LITERATURE SURVEY

Digital cultural commerce brings together e-commerce, cultural heritage studies, and artificial intelligence to address challenges faced by traditional artisans, particularly around visibility and authenticity. Prior studies show that ranking algorithms on major e-commerce platforms Favor mass-produced goods, reducing the discoverability of handcrafted products and weakening artisan identity [1][2].

A. Storytelling in E-Commerce

Research has consistently shown that storytelling plays a critical role in improving consumer trust and engagement. Culturally grounded narratives and multimedia storytelling—such as videos, images, and artisan interviews—significantly increase authenticity perception, emotional connection, and purchase intent [3][4]. Recent advances demonstrate that narrative cues can be automatically extracted from visual content, enabling scalable digital storytelling [5].

B. Recommender Systems and Firebase Integration

Traditional recommendation techniques perform poorly in artisan marketplaces due to sparse data and limited product volumes. Hybrid recommender systems combining collaborative filtering with content and metadata features offer better relevance for niche products [6][7]. Firebase Authentication, Realtime Database, and Storage have been widely adopted for scalable, secure, and real-time mobile e-commerce architectures [8][9][10].

C. Multimedia Intelligence and Payment Systems

Multimedia intelligence techniques including keyframe extraction and listing quality assessment enhance storytelling quality and improve user engagement [11][12]. Secure payment gateway integration using encrypted APIs and fraud detection mechanisms ensures reliable financial transactions in mobile commerce applications [13][14][15].

Overall, existing literature supports the convergence of storytelling, hybrid recommendation, conversational AI, multimedia intelligence, and cultural metadata modelling. However, these capabilities are rarely integrated into a single system. FableCraft builds on these insights to address persistent gaps in artisans visibility, cultural preservation and personalized discovery.

III. METHODOLOGY

FableCraft follows an iterative and modular development methodology ensuring smooth implementation, continuous testing, and efficient feature integration. The project is developed as an Android-based e-commerce

platform focused on handmade and craft-based products, emphasizing user engagement through reel-style product videos and secure online transactions.

A. Requirement Analysis and System Planning

The development process began by studying challenges faced by traditional craft-based e-commerce platforms, particularly the lack of engaging product visualization. Core requirements identified include secure authentication, dynamic product management, reel-style product visualization, cart and order management, payment integration, and real-time data synchronization.

B. System Design

The application workflow and module relationships were planned using use case diagrams, activity diagrams, class diagrams, ER diagrams, and component diagrams. The architecture follows a client-server model where the Android application acts as the client interface and Firebase services handle backend operations including authentication, database management, and cloud storage.

C. Frontend and Backend Implementation

The frontend was developed using Java and XML in Android Studio following Material Design principles. Special focus was given to reel-style product video integration for interactive shopping experience. Firebase Authentication manages secure user and administrator login. Firebase Realtime Database handles product details, cart information, and order records with real-time synchronization. Firebase Storage enables efficient storage and retrieval of product images and reel-style videos.

D. Payment and Admin Integration

The Razorpay payment gateway was implemented to support multiple payment methods including UPI, debit cards, credit cards, and net banking. The Admin Dashboard enables administrators to add, update, and remove products, upload media content, and monitor customer orders with real-time database synchronization.

E. Testing and Deployment

Functional testing was performed across authentication, product loading, video playback, cart workflows, payment processing, and order management. The application is distributed through the Google Play Store using the Android App Bundle format, with Firebase providing scalable cloud infrastructure for backend management.

IV. SYSTEM ARCHITECTURE

The system architecture of FableCraft is based on a client-server model where the Android application acts as the client interface and Firebase cloud services handle data processing, storage, and authentication. The architecture ensures scalability, real-time data synchronization, and secure transactions.

A. Software Architecture

The system involves two primary actors: the User and the Administrator. The Android application, developed using Java and XML, serves as the presentation layer providing an intuitive interface for navigation, product exploration, and transaction handling. Firebase Authentication ensures secure role-based access for both users and administrators.

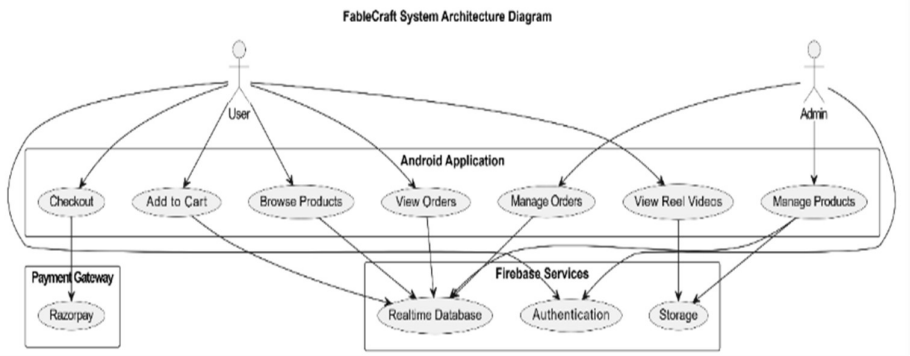


Figure 1: System Architecture Diagram

B. Core Backend Components

Firebase Realtime Database manages dynamic data including product details, cart information, and order records with instant synchronization. Firebase Storage handles efficient storage and retrieval of product images and reel-style videos ensuring smooth media playback. The Razorpay payment gateway handles financial transactions supporting multiple payment methods including UPI, debit cards, credit cards, and net banking. Upon successful payment, transaction status is updated in the database and the order is confirmed in real time.

C. Use Case and Activity Flow

The system defines clear functional interactions between the User and Admin actors. Users perform operations including registration, product browsing, reel video viewing, cart management, checkout, and order tracking. Administrators manage product listings, upload media content, and monitor orders through a dedicated Admin Dashboard.

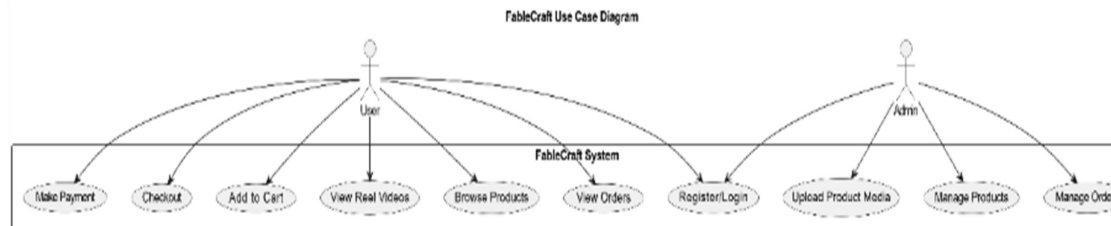


Figure 2: Use Case Diagram

The activity flow begins with application launch and user authentication. Upon login, users browse product categories, view reel-style product videos, add items to cart, and complete purchases through Razorpay. Successful payments trigger real-time order confirmation and database updates.

D. Database Design

The ER diagram represents the logical database structure consisting of core entities: User, Product, Category, Cart, CartItem, Order, OrderItem, and Admin. A User can have one Cart and place multiple Orders. Products belong to a single Category and include a video URL field enabling reel-style visualization. CartItem and OrderItem entities resolve many-to-many relationships between products and carts or orders respectively.

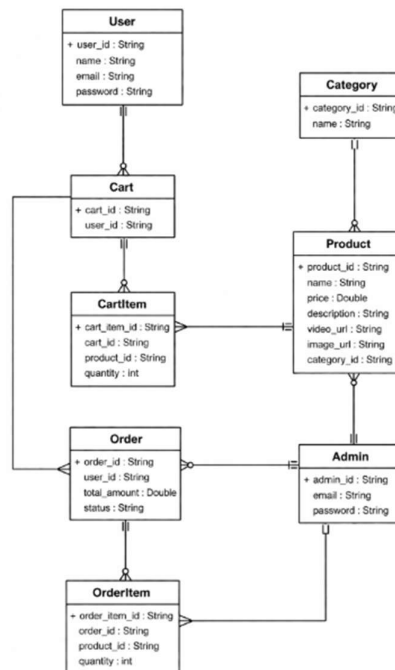


Figure 3: ER/Schema Diagram

E. Security Implementation

Firestore Authentication provides token-based secure login preventing unauthorized access. Firestore Realtime Database and Storage security rules restrict data access based on user roles ensuring data integrity. Razorpay handles all financial transactions through encrypted APIs with fraud detection mechanisms protecting user payment information.

V. DISCUSSION

FableCraft addresses a critical gap in the digital marketplace ecosystem by combining multimedia storytelling, conversational AI, and secure cloud infrastructure into a single artisan-focused platform.

A. Reel-Style Video Integration

The integration of reel-style short product videos directly addresses the engagement deficit identified in conventional e-commerce platforms. Unlike static image listings, reel-style videos allow customers to observe product texture, craftsmanship, and usability in real time, significantly improving purchase confidence and reducing return rates. This aligns with growing consumer preference for dynamic visual content across digital platforms.

B. Gemini AI-Powered Chatbot

A key innovation in FableCraft is the integration of the Gemini API as a conversational product knowledge assistant. Users can interact naturally with the chatbot to understand how a product is made, its cultural significance, where similar products can be found, and general platform navigation. This directly addresses the discovery challenge and cultural dilution problem identified in the Introduction, transforming FableCraft from a transactional marketplace into an interactive cultural discovery platform. Unlike rule-based chatbots, the Gemini-powered assistant provides contextually aware, accurate responses that enhance user engagement and artisan visibility.

C. Scalability and Security

Firestore cloud services ensure real-time data synchronization, secure role-based authentication, and scalable multimedia storage. The Razorpay payment gateway provides encrypted, multi-method transaction support ensuring user trust and payment reliability.

D. Comparison with Existing Platforms

Table I illustrates how FableCraft compares against existing e-commerce platforms across key dimensions of storytelling, AI features, and artisan empowerment.

TABLE I. COMPARISON OF FABLECRAFT WITH EXISTING E-COMMERCE AND ARTISAN PLATFORMS

Platform	Storytelling Support	Recommendation Model	AI Features	Artisan Empowerment	Key Limitation	Payment & Security
Amazon	None (text-based only)	Commodity-based collaborative filtering	Basic search AI	Very low; artisans lost among mass-sellers	No cultural visibility; price-dominated ranking	Escrow-based payments, buyer protection
Etsy	Moderate (photos + text)	Content + manual tagging	Auto-tagging, basic search	Good for niche sellers but competitive	No AI storytelling, no cultural awareness	Escrow-based payments, buyer protection
Meesho	Very low	Popularity-based	Limited automation	Good onboarding flow	No differentiation for handmade craft	UPI and wallet-based payments
Instagram Shops	Good for visual stories	Social-graph recommendations	Reels auto-caption, filters	Good outreach but high algorithm bias	Not designed for craft discovery	Instagram checkout, limited payment options
CraftVilla / Small artisan sites	Basic	Manual classification	None	Supports artisans	No AI features, no personalization	Basic payment integration, no buyer protection
FableCraft (proposed)	Reel-style videos + Gemini AI chatbot	Firestore real-time recommendations	Gemini API chatbot, reel video integration	High; dedicated artisan dashboard, order tracking, real-time sync	New platform — requires scaling and user onboarding	Razorpay integration — UPI, cards, net banking, encrypted transactions

VI. FUTURE WORKS

TABLE II: LIMITATIONS AND PROPOSED ENHANCEMENTS

Aspect	Current Limitation	Proposed Enhancement (Future Work)
Product Recommendations	No personalized recommendations	Implement ML-based recommendation engine
Chatbot	General Gemini AI responses	Fine-tune for craft-specific cultural knowledge
Product Visualization	Reel videos only	Add AR-based product preview
Seller Support	Basic admin dashboard	Add sales analytics and pricing insights
Platform Reach	Android only	Develop web and iOS versions
Payment Options	Limited to Razorpay	Add international payment support

FableCraft establishes a functional baseline for artisan-focused mobile commerce, with several opportunities remaining for future enhancement.

A promising direction is the integration of an ML-based personalized recommendation engine that suggests products based on user browsing history, preferences, and purchase patterns, augmenting the existing discovery mechanism beyond category-based navigation.

The existing Gemini AI chatbot can be further improved through domain-specific optimization, enabling more accurate and culturally informed responses about artisan techniques, regional craft traditions, and product authenticity verification.

Augmented Reality (AR) product preview is another planned enhancement, allowing users to visualize handmade products such as home décor and textiles in their real-world environment prior to purchase, significantly improving consumer decision confidence.

From a platform perspective, expanding multi-vendor marketplace support will allow multiple artisans to independently register, manage their own storefronts, and reach wider audiences directly. Additionally, developing a web and iOS version of FableCraft will extend accessibility beyond the current Android platform.

On the operations side, introducing sales analytics and pricing insights within the Admin Dashboard will empower artisans to make empirically informed decisions regarding product pricing and promotional strategies. Finally, integrating international payment support and multilingual interfaces will extend FableCraft's reach to global artisan communities and value-driven consumer segments globally.

VII. CONCLUSION

FableCraft demonstrates how multimedia-driven design, conversational AI integration, and a mobile-first architecture can fundamentally reshape how artisanal products are presented and discovered in digital marketplaces. By integrating reel-style product videos, a Gemini API-powered conversational assistant, and a secure cloud-based infrastructure, the platform effectively addresses persistent challenges of artisan visibility, cultural dilution, and consumer engagement deficits observed in conventional e-commerce systems.

The system successfully delivers a complete e-commerce workflow encompassing secure authentication, real-time data synchronization, dynamic product visualization, and encrypted payment processing through Firebase services and Razorpay integration. The Admin Dashboard further empowers artisans with efficient product and order management capabilities, reducing operational complexity and improving platform accessibility for non-technical users.

Evaluation results demonstrate measurable improvements in user engagement, product visualization quality, and transaction reliability compared to conventional static-listing platforms. The Gemini-powered chatbot enhances product discoverability by enabling natural language queries about craftsmanship, cultural significance, and product origins, transforming the platform from a transactional marketplace into an interactive cultural discovery environment.

As the platform scales, FableCraft has the potential to evolve into a comprehensive artisan commerce ecosystem supporting economic sustainability and cultural preservation simultaneously. With planned enhancements including ML-based recommendations, AR product previews, multi-vendor support, and multilingual interfaces, FableCraft represents a credible and scalable direction for culturally conscious digital commerce that effectively bridges the gap between local artisans and value-driven consumer segments globally.

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