

Artisan Nexus: A Digital Platform Connecting Traditional Artisans with Global Markets

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Abstract—The global artisan sector is fragmented, leaving craftspeople economically isolated from global markets due to a persistent digital divide. This paper addresses this challenge by documenting the design of "Artisan Nexus," a specialized e-commerce and portfolio platform engineered to connect artisans directly with buyers. We present a complete system architecture, grounded in Design Thinking, utilizing a MERN stack (MongoDB, Express.js, React.js, Node.js) with a flexible NoSQL database to manage heterogeneous artisan data and specialized commission-request workflows.

Index Terms—Digital platforms, artisan economies, e-commerce, system architecture, MERN stack, NoSQL, Design Thinking

I. INTRODUCTION

The global market for handcrafted goods represents a multi-billion dollar industry, yet the producers—the artisans themselves—are frequently disconnected from this value chain [1]. Traditional craftspeople often face significant barriers to entry when attempting to access global markets, including a lack of technical expertise, limited access to digital infrastructure, and exploitation by intermediaries who capture a disproportionate share of the profits. This phenomenon is a key feature of the "digital divide," where the benefits of the digital economy are not distributed equitably [2]. While generic e-commerce platforms exist, they are often ill-suited to the unique needs of artisans, lacking features for custom commissions, detailed storytelling (provenance), and portfolio curation.

The core problem addressed by this project is the systemic friction between local artisans seeking fair compensation

and global consumers seeking authentic, high-quality, and customizable goods. For craftspeople, this manifests as an inability to build a sustainable digital presence. For buyers, such as interior designers or discerning collectors, it manifests as a time-consuming, fragmented, and unreliable sourcing process.

This paper proposes the design and architecture of "Artisan Nexus," a web-based platform specifically engineered to serve as a direct bridge between these two groups. The platform is conceptualized as more than a simple marketplace; it is a full-service tool for artisans to build a digital portfolio, manage client relationships, and securely process complex, high-value custom orders.

Our design is informed by research in three primary domains: the socio-economic impact of the digital divide on an artisanal context, the design of niche e-commerce platforms, and the application of user-centric design methodologies. The "digital divide" extends beyond mere access to technology; it encompasses the skills and opportunities required to use Information and Communication Technologies (ICTs) for economic gain [2]. For traditional artisans, this divide is a significant barrier [1]. Artisan Nexus is designed to lower this barrier by providing an abstracted, easy-to-use "platform-as-a-service" (PaaS) model, removing the need for artisans to manage their own hosting or site development.

Furthermore, standard e-commerce platforms are optimized for mass-market, standardized goods. Cultural products carry intangible value tied to their story and provenance. Research argues that platforms for niche cultural products must prioritize "storytelling" and "authenticity" over simple transactional efficiency [3]. This confirms the need for a specialized solution

that integrates portfolio management and a robust commission-management system, which are central to the Artisan Nexus design.

To ensure the platform effectively serves its target users, we adopted a theoretical framework based on Design Thinking. This user-centric methodology prioritizes empathy, definition, ideation, and prototyping [5]. By beginning with an empathetic understanding of the end-users, we can define the problem from their perspective. This approach is critical when designing for "everyday life" contexts, as it moves beyond purely technical specifications to address the user's holistic experience [5].

II. METHODS AND MATERIALS

The project's methodology followed a two-stage process. The first stage (Workshop 1) focused on problem definition and requirements elicitation through a user-centric approach. The second stage (Workshop 2) translated these requirements into a tangible system architecture and data model.

A. Requirements Elicitation (Workshop 1)

Following the Design Thinking framework, we developed two primary personas to represent the platform's key stakeholders:

- **Elena, the Traditional Potter:** An artisan in her late 50s with high craft skill but low digital literacy. She needs a simple, visual way to showcase her portfolio, communicate with clients, and manage custom orders without complex invoicing software.
- **Liam, the Interior Designer:** A buyer in his 30s who is tech-savvy and sources unique items for high-end clients. He needs a reliable, curated platform to discover artisans, verify authenticity, and manage multiple complex commissions in one place.

Based on the needs and pain points of these personas, we derived a set of core functional requirements. The most critical requirements are summarized in Table I.

B. System Architecture (Workshop 2)

The elicited requirements informed the design of a three-tier system architecture, as illustrated in Fig. 1. This architecture separates concerns into presentation, business logic, and data persistence.

- **Presentation Tier (Front-End):** A single-page application (SPA) built using **React.js**. This choice provides a fast, responsive user interface, which is critical for a visually-driven portfolio platform.
- **Logic Tier (Back-End):** A RESTful API built using **Node.js** and the **Express.js** framework. Node.js was selected for its non-blocking I/O, making it efficient for handling concurrent user requests and real-time messaging.
- **Data Tier (Database):** A **MongoDB (NoSQL)** database. This was a critical choice, as the heterogeneous nature of artisan portfolios (e.g., different attributes for pottery vs. textiles) is poorly suited to a rigid relational schema.

This MERN (MongoDB, Express, React, Node) stack was chosen for its rapid development ecosystem, strong community support, and its native handling of JSON, which simplifies data flow between the tiers.

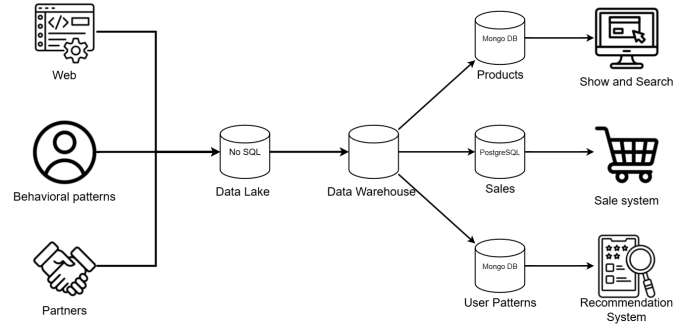


Fig. 1: High-Level Three-Tier System Architecture (Workshop 2)

C. Data Modeling (Workshop 2)

The data model, designed for MongoDB, is centered on a few key collections (the NoSQL equivalent of tables). The relationships are managed at the application level.

The core collections are:

- **User:** A base collection containing authentication data (email, password hash) and a role (e.g., 'artisan', 'client').
- **Artisan & Client:** Collections that extend the User model, holding profile-specific information. The Artisan collection contains portfolio details, bio, and location.
- **Product:** A collection where each document represents an item for sale or a portfolio piece. It is designed with a flexible schema to accommodate custom attributes.
- **Commission:** A collection that tracks the entire lifecycle of a custom order, linking one Artisan to one Client and containing all messages, agreed-upon terms, and status updates.
- **Transaction:** A collection to log all financial activities, linked to Product sales or Commission milestones.

III. RESULTS & DISCUSSION

The primary result of this design phase is a comprehensive blueprint for the Artisan Nexus platform, grounded in user needs and justified by established architectural principles. This section presents the key interface designs that validate the methodology and discusses the implications of our architectural choices.

A. Core System Components (Wireframes)

The functional requirements and system architecture were translated into a set of wireframes (Workshop 2) to define the user experience. Fig. ?? shows three key screens that directly address the needs of our personas.

- **Artisan Profile Page (A):** This is "Elena's" digital storefront. It prioritizes large visuals, a prominent "story"

TABLE I: Core Functional Requirements Derived from Personas

| Requirement ID | Description |
|----------------|--|
| FR-01 | Digital Portfolio Creation: Artisans (Elena) must be able to create and manage a portfolio page with high-resolution images, descriptions, and "story". |
| FR-02 | Commission Management: Buyers (Liam) must be able to submit a detailed "Commission Request" (e.g., dimensions, materials, deadline). |
| FR-03 | Secure Messaging: A dedicated messaging system must exist for artisans and buyers to discuss commission details, share images, and finalize terms. |
| FR-04 | Transaction Management: The system must handle multi-stage payments for commissions (e.g., 50% deposit, 50% on completion). |
| FR-05 | Product/Artisan Discovery: Buyers (Liam) must be able to search and filter products and artisans by category, location, and materials. |

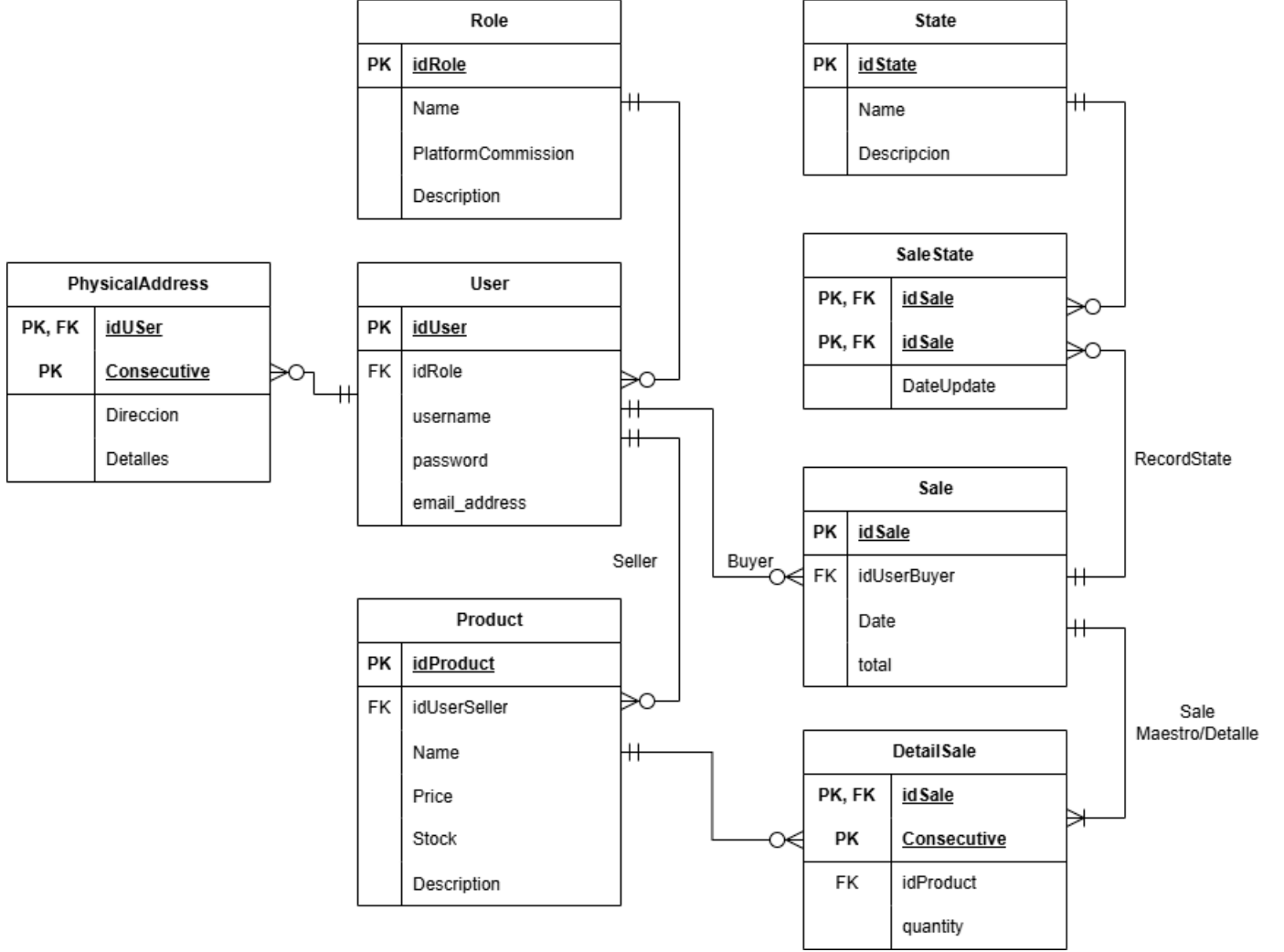


Fig. 2: Entity-Relationship Diagram of Core Data Entities (Workshop 2)

section, and a clear "Request Commission" call-to-action (FR-01).

- **Product Gallery (B):** This is "Liam's" discovery tool. It features robust filtering and highlights the artisan's name and location, reinforcing authenticity (FR-05).
- **Commission Request Workflow (C):** This is the platform's core specialized feature. It guides "Liam" through a structured form to specify his exact needs, reducing ambiguity and streamlining the negotiation process for "Elena" (FR-02, FR-03).

B. Discussion

Our decision to implement a three-tier architecture, rather than a more complex microservices model, was deliberate. This approach aligns with findings that monolithic or three-tier systems offer faster development cycles and reduced operational complexity for startups and projects in the minimum viable product (MVP) phase [4]. While a microservices architecture might offer greater long-term scalability, the immediate priority for Artisan Nexus is rapid deployment and validation of the core business model.

The selection of MongoDB for the data tier is a key enabler of the platform's value proposition. As noted by [3],

platforms for cultural goods must handle diverse and unstructured data. MongoDB's schema-less nature allows "Elena" (potter) to define attributes like 'glaze' and 'firing_temp', while another artisan (e.g., a weaver) could define 'material' and 'weave_pattern' in their `Product` documents without requiring database schema alterations.

This flexibility, however, introduces limitations. The trade-off for a NoSQL database is the loss of native ACID transactions. Managing the financial integrity of a multi-stage commission (FR-04) will require robust application-level logic to ensure consistency, for example, by implementing a two-phase commit pattern when updating `Commission` and `Transaction` collections simultaneously.

Ultimately, the resulting design directly addresses the needs of our personas. "Elena" receives a simple-to-use, powerful portfolio tool that abstracts away technical complexity. "Liam" gains a streamlined, professional, and reliable platform for sourcing and commissioning custom work, solving his primary pain points of discovery and trust.

IV. CONCLUSIONS

This paper has presented the design of Artisan Nexus, a digital marketplace aimed at resolving the persistent digital divide that isolates artisans from global markets. By grounding our methodology in Design Thinking and deriving requirements from the representative personas of "Elena the potter" and "Liam the designer," we have defined a platform that is highly specialized for the craft sector. The proposed three-tier architecture, built on the MERN stack, provides a pragmatic balance of rapid development, flexibility, and performance.

The system's core features—a visual-first portfolio, integrated secure messaging, and a structured commission management workflow—are designed to directly address the primary pain points of both artisans and buyers. Future work will proceed with the implementation of a minimum viable product (MVP), focusing on developing and testing the secure messaging and multi-stage transaction modules (FR-03, FR-04), as these represent the highest technical risk. Following a successful pilot, future research will explore the integration of AI-driven recommendation engines to proactively match buyer needs with artisan skills.

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