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Constructify: Smart Digital Marketplace for Construction Materials

1. Problem Statement

The construction industry is one of Kenya's fastest-growing economic sectors, yet material procurement remains slow, fragmented, and expensive. Buyers face persistent challenges such as:

- Limited visibility of suppliers and fluctuating prices.
- Prevalence of counterfeit or substandard products.
- Logistical inefficiencies in sourcing and delivery.

On the supply side, small and medium-sized sellers struggle to reach customers beyond their immediate localities, leaving the market highly inefficient.

While generic e-commerce platforms exist, they are not tailored to the unique requirements of construction procurement such as bulk ordering, material verification, and logistics support. There is a clear market gap for a specialized platform that leverages AI to enhance transparency, trust, and efficiency in this sector.

2. Justification

- **Relevance:** Constructify will modernize construction procurement by offering transparency, competitive pricing, and verified suppliers while giving sellers a scalable marketplace.
- **Alignment with Sustainable Development Goals (SDGs):**
 - **SDG 9 – Industry, Innovation, and Infrastructure:** Strengthens infrastructure growth by improving supply chain efficiency.
 - **SDG 8 – Decent Work and Economic Growth:** Boosts SME competitiveness, creating new opportunities in trade and employment.
- **Development Pillar: *Economic Pillar*** – enhancing industry competitiveness and driving inclusive growth.

3. Project Objectives

1. Develop a user-friendly online marketplace for construction materials tailored to Kenyan needs.
2. Integrate AI-driven features to personalize buyer experiences, detect fraud, and support competitive pricing.
3. Provide secure payment integration and streamlined logistics.
4. Establish trust and accountability through seller verification and product quality assurance.

4. Proposed Technology and Methodology

Platform Features

- Buyer Side: Search, filter, compare, and purchase materials with transparent pricing.
- Seller Side: Dashboard for listing products, managing inventory, and setting prices.
- Payments: M-Pesa and card integration.
- Logistics: Delivery tracking and third-party logistics support.
- Trust Layer: Ratings, reviews, and seller verification.

AI/ML Enhancements (MVP Scope)

1. Personalized Recommendations – Suggest complementary materials to buyers (e.g., cement → rebar, sand).
2. Smart Search with NLP – Buyers can use natural queries such as “*affordable roofing sheets near Nairobi.*”
3. Price Prediction & Market Insights – Machine learning models analyze trends to suggest optimal prices.
4. Fraud & Counterfeit Detection – AI flags suspicious seller behaviour and validates product authenticity via image analysis.

Technology Stack

- Frontend: React/Next.js with Tailwind CSS.

- Backend: FastAPI/Django with REST APIs.
- Database: PostgreSQL/MySQL.
- AI/ML: TensorFlow, Scikit-learn, and NLP models.
- Payments: M-Pesa API, Stripe.
- Hosting: AWS, Azure, or DigitalOcean.

5. Expected Impact

- Efficiency: Streamlined procurement reduces delays and overhead.
- Trust: AI-powered verification combats counterfeits, ensuring material quality.
- Economic Growth: Expands SMEs' reach and competitiveness in the construction supply chain.
- Affordability: Competitive pricing benefits buyers and stimulates market efficiency.
- Scalability: Future-ready platform adaptable to regional expansion and advanced fintech services like credit scoring or BNPL.

6. Deliverables

- Functional web marketplace with buyer and seller interfaces.
- Integrated AI features: recommendations, smart search, pricing engine, fraud detection.
- Secure digital payments and logistics module.
- Documentation of system design, methodology, and prototype testing.