# Product Requirements Document (PRD)

## AI Pricing Agent for Manufacturing & Construction Procurement

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## 1. Project Summary

Objective: Develop an AI-powered agent to support procurement and sourcing teams in benchmarking material and service prices, identifying cost savings, and generating should-cost models. The agent will enable smarter, faster purchasing decisions by integrating internal spend data with real-time market intelligence.

Strategic Goals:
• Automate cost benchmarking
• Improve quote validation and supplier negotiations
• Provide dynamic should-cost modeling
• Demonstrate value to customers through cost savings
• Enable predictive cost insights for key categories

## 2. Target Users & Stakeholders

Sourcing Teams – RFQ evaluation, quote comparison, should-cost validation
Procurement – Supplier negotiation, compliance checks
Sales – Savings demonstration for customers
Finance – Track savings impact on margins and ROI

## 3. Scope of Materials and Services

Coverage: All material and service categories relevant to manufacturing and construction
Focus: Commodities, labor services, MRO, capital equipment
Geography: North America (initial phase), with ability to expand

## 4. Key Features & Functional Requirements

Core Engines:
• Market Intelligence Engine – Aggregates pricing from suppliers, indices, and catalogs
• Cost Benchmarking Engine – Compares internal costs to external prices; anomaly detection
• Should-Cost Modeling – Calculates cost breakdowns
• Predictive Analytics (Phase 2) – Forecasts cost trends
• Integration Engine – Connects to ERP/procurement systems

## 5. Technical Architecture

Frontend: React, D3.js
Backend: Node.js or Python (FastAPI)
AI/ML: PyTorch, XGBoost, TensorFlow
Data Store: PostgreSQL, MongoDB, InfluxDB
Data Lake: Redshift or BigQuery
Hosting: AWS/GCP/Azure
Orchestration: Kubernetes

## 6. Data Requirements

Internal: PO history, RFQs, contracts
External: Market indices, supplier APIs, wage databases
Historical: At least 24 months (3-5 years preferred)
Governance: Standard naming/units, price normalization, anomaly detection

## 7. Security, Compliance & Governance

Zero-trust architecture, RBAC, TLS 1.3 encryption
Compliance: GDPR, CCPA, SOC 2 Type II, ISO 27001
Audit logs for traceability

## 8. Performance Standards

Pricing query: <200ms
Full report: <30s
Uptime: >99.9%
ML Accuracy: >95% (critical categories)
Data accuracy: >97% verified

## 9. Implementation Phases

Phase 0: Discovery
Phase 1: MVP Build
Phase 2: Expansion
Phase 3: Predictive AI
Phase 4: Full Rollout

## 10. Risks & Mitigation

• Dirty/missing data – Cleaning tools, anomaly detection
• Integration failures – Modular APIs, middleware

• User resistance – Training, champions, feedback loop
• Scope creep – Phase-gated roadmap
• Regulatory exposure – Privacy-by-design

## 11. KPIs & Success Criteria

• 95% pricing accuracy
• 80%+ adoption
• 10–15% cost reduction identified
• Sub-2s response
• Executive dashboard usage

## 12. Open Questions

• Finalize pilot categories
• Confirm UI format
• Select data vendors
• Determine SLA for data refresh
• Define override/approval flow