Dubai Construction ERP Dashboard - Functional Specification

1. Executive Summary

Objective: To implement a centralized ERP dashboard for the Dubai construction portfolio, integrating 17 existing data modules into a single analytical view.

Core Data Sources:

- **Financials:** Contracts, Payment Applications, Purchase Orders, Variation Orders.
- **Operations:** Projects, Daily Reports, Equipment, Work Packages.
- **Quality & Safety:** Inspections, Safety Incidents.
- **Stakeholders:** Contractors, Suppliers, Employees, Clients.

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2. Implementation Roadmap

To build this ERP dashboard, the following core activities are required:

Phase 1: Data Architecture

1. **Data Integration:** Establish specific query logic to aggregated CSV data from all 17 sources.
2. **Global Filtering:** Implement a dynamic `project_id` slicer that cascades across all metrics.
3. **Relational Mapping:** Link `project_id` across disparate datasets (e.g., matching Safety Incidents to Project Names).

Phase 2: Logic & Calculation

1. **Financial Aggregation:** Develop formulas to sum "Certified" and "Paid" amounts distinct from "Submitted".
2. **Risk Modeling:** Create logic to flag projects where `Actual Progress` < `Planned Progress`.
3. **Performance Scoring:** Calculate weighted averages for Contractor Ratings and Supplier Lead Times.

Phase 3: Visualization & Reporting

1. **Chart Construction:** Build the 16 specific visualizations defined below.
2. **KPI Dashboarding:** Implement the 8 headline metrics.
3. **Tabular Reporting:** Construct the detailed "Project Health Matrix".

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3. Required Dashboard Components

The dashboard must implement the following specific visualizations and metrics.

A. Headline KPIs (The "Pulse")

These 8 metrics must be calculated and displayed prominently:

1. **Total Contract Value (AED):** Sum of active contracts.
2. **Certified Payments (AED):** Validated work done.
3. **Approved VO Value (AED):** Cost of scope changes.
4. **Total PO Value (AED):** Procurement spend.
5. **Active Projects Count:** Operational workload.
6. **Inspection Pass Rate (%):** Quality benchmark.
7. **Open Safety Incidents:** HSE risk indicator.
8. **Equipment Utilization (%):** Asset efficiency.

B. Financial Performance Charts

These charts are required to analyze budget and cash flow:

1. **Budget Utilization (Donut Chart):**
    - *Data:* Certified Amount + Paid Amount vs. Remaining Budget.
2. **Payment Cashflow Status (Column Chart):**
    - *Data:* Total value grouped by status: Certified, Paid, Submitted, Rejected.
3. **Contract Value by Type (Bar Chart):**
    - *Data:* Total contract value grouped by discipline (Civil, MEP, etc.).
4. **Variation Order Trend (Line Chart):**
    - *Data:* Cumulative VO value plotted monthly over the project lifecycle.

C. Operational & Project Charts

These charts track schedule and progress:

1. **Project Status Distribution (Bar Chart):**
    - *Data:* Count of projects by status (In Progress, On Hold, Completed).
2. **Project Type Mix (Pie Chart):**
    - *Data:* Portfolio breakdown by sector (Residential, Infra, Commercial).
3. **Manpower Trend Analysis (Stacked Area Chart):**
    - *Data:* Monthly average headcount split by Direct Labor vs. Subcontractors.
4. **Inspection Result Analysis (Column Chart):**
    - *Data:* Count of inspections by result (Pass, Fail, Partial).

D. Supply Chain & Procurement Charts

These charts monitor vendor performance:

1. **PO Status Breakdown (Column Chart):**
    - *Data:* Purchase Order value split by status (Issued, Closed, Draft).
2. **VO Reason Analysis (Bar Chart):**
    - *Data:* Variation costs grouped by root cause (Design Change, Site Condition, etc.).
3. **Permit Status Overview (Donut Chart):**
    - *Data:* Count of active vs. expired permits.
4. **Supplier Lead Time Analysis (Scatter/Bar):**

    - *Data:* Average days (Delivery Date - Issue Date) by Supplier Category.

E. HSE, Quality & Resource Charts

These charts track safety and assets:

1. **Safety Incidents by Type (Bar Chart):**
    - *Data:* Incident counts by category (Near Miss, LTI, First Aid).
2. **Safety Severity Distribution (Donut Chart):**
    - *Data:* Incidents grouped by severity level (High, Medium, Low).
3. **Equipment Fleet Status (Pie Chart):**
    - *Data:* Equipment count by status (Available, In Use, Maintenance).
4. **Contractor Performance (Bar Chart):**
    - *Data:* Average performance rating for top 10 active contractors.

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4. Project Health Matrix (Detailed Table)

A comprehensive data table is required to list the Top 10 Projects with the following columns:

- **Project Name & ID**
- **Current Status** (with R/A/G indicators)
- **Completion %** (Visual progress bar)
- **Financials:** Contract Value vs. Certified Amount
- **Risk Indicators:** Open VOs count, Open Safety Incidents count

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5. Functional Data Requirements

To support the above, the system must perform these specific data operations:

- **Time-Intelligence:** Ability to group `daily_site_reports` and `payment_applications` by Month/Year.

- **Cross-Referencing:** Validating `contractor_id` in the `projects` table against the `contractors` master list.
- **Threshold Monitoring:** Automatically flagging "High Risk" if Safety Incidents > 0 or Schedule Slippage > 10%.