Section - E | G5

Strategic Procurement Analysis: Optimizing Spend Efficiency & Reducing Risk

Public Administration & Government Finance

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Context & Problem Statement

Sector Context:
Public procurement involves managing billions of taxpayer dollars. The City of Chicago allocates funds across 45+ departments and thousands of vendors. Inefficiencies here lead to wasted public funds and operational delays.

Problem Statement:
"Is the City’s procurement spending efficient and stable, or are there hidden risks in vendor concentration, approval bottlenecks, and contract volatility?"

Objective:
To build a dynamic dashboard that transforms raw contract data into actionable intelligence, specifically identifying spending concentration, administrative delays, and financial risks.

Data Engineering (Source to Sink)

Source (The "Extract")

- Name: City of Chicago Administration & Finance Data (Public Ledger).
- Size: 10,000 Rows, 20 Columns (Raw).
- Time Period: 1990 – 2026 (Projected).

Data Cleaning (Key Actions)

- Standardization: Unified inconsistent vendor names (uppercase) for accurate grouping.
- Imputation: Filled missing Start/End dates to enable timeline analysis.
- Feature Engineering: Created Approval_Delay_Days and Contract_Duration to measure operational efficiency.

Data Dictionary (The "Governance")

- Created a comprehensive Data Dictionary to track the transformation pipeline.
- Documented data types, mapped raw columns to cleaned features, and recorded every "Issue Found" against its specific "Cleaning Action Taken" to ensure data integrity and reproducibility.

KPI & Metrics Framework

Primary KPIs :

- Total Spend: $31.56 Billion (Measures Financial Scale).
- Avg Approval Delay: 1180 Days (Measures Administrative Efficiency).
- Negative Mods: 80 (Measures Negative).
- % High Value Contracts: 10.9% (Measures Portfolio Complexity).

Why These KPIs?

We chose a mix of Financial (Spend), Operational (Delay), and Risk (Concentration) metrics to provide a holistic "Health Check" of the procurement system, rather than just looking at costs.

Key Insights

Observation 1 (The Whale)

Spending is highly concentrated. The Department of Finance and Aviation alone account for over 35% of the total budget.

Observation 2 (Vendor Monopoly)

The top 5 vendors control nearly 30% of the entire city spend. The largest single vendor (Blue Cross Blue Shield) takes ~15% of the total pie.

Observation 3 (The Bottleneck)

The average contract takes 805 days (>2 years) to be fully approved, indicating a severe administrative lag.

Observation 4 (Volatility)

25% of contracts are "Depends Upon Requirements" (Blanket Contracts), meaning the city has indefinite financial commitments without fixed caps.

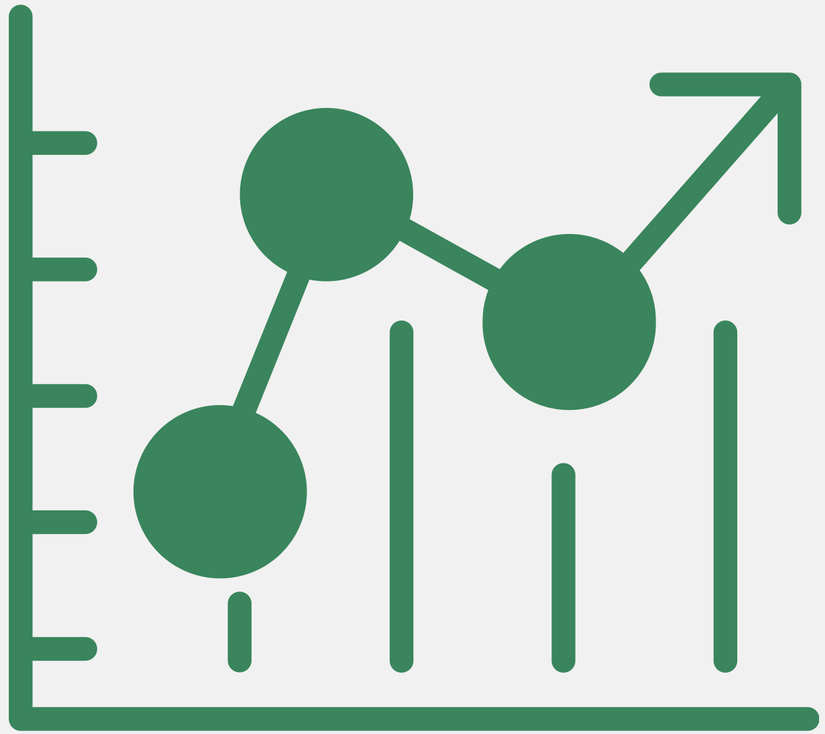
Advanced Analysis

Risk Segmentation:

- We segmented contracts by "Risk Flags": High Value, Negative Modifications, and Zero Awards.
- Finding: While only 0.8% of contracts have Negative Modifications, these represent specific failures in planning that incur penalties or scope reductions.

Pareto Analysis:

- 80/20 Rule Confirmed: A small fraction of "Large" contracts drives the vast majority of spending.
- Insight: Operational focus should shift from the thousands of "Small" contracts to the few "Large" ones to maximize impact.



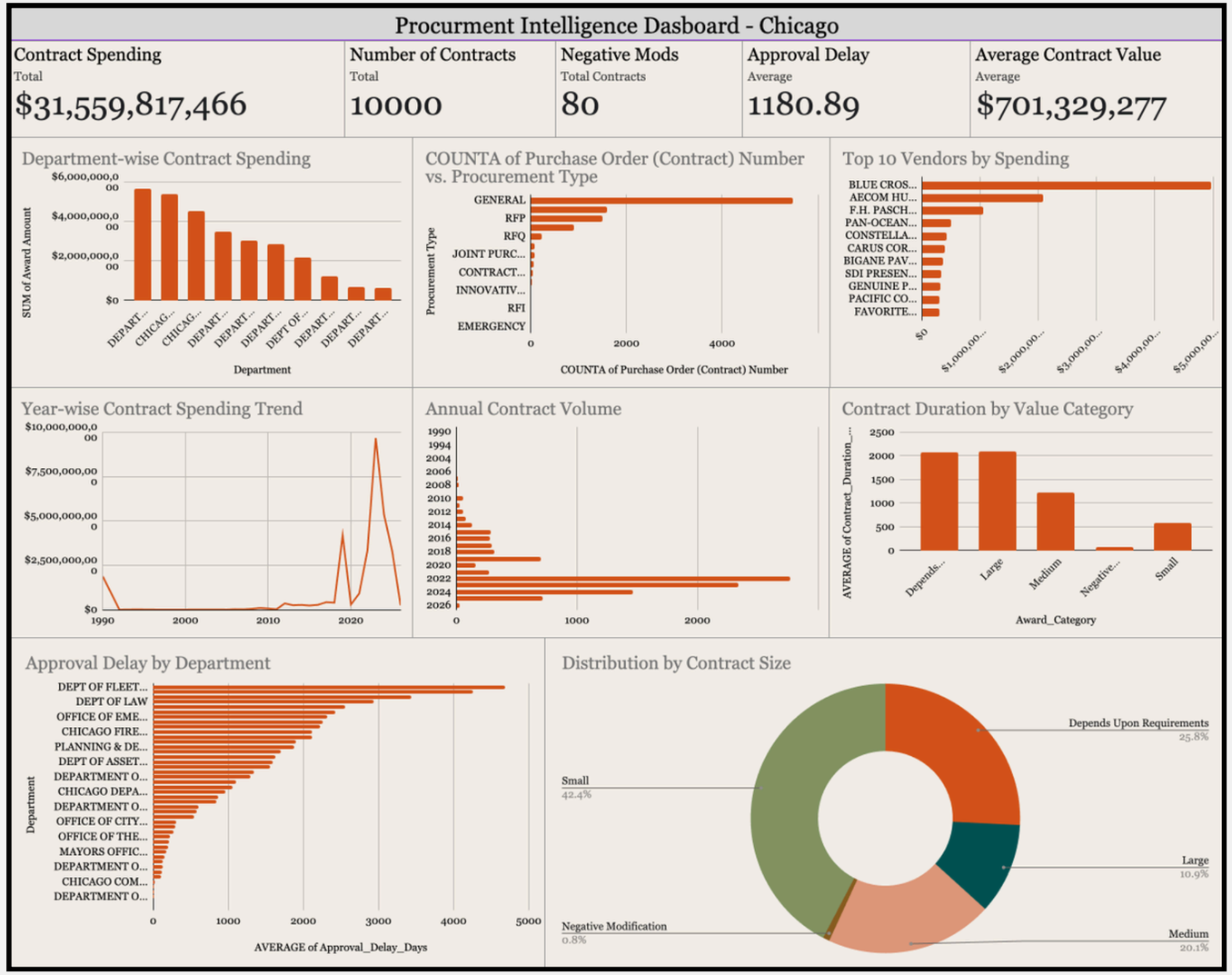
Dashboard Walkthrough

Executive View (Top Row):

- Immediate visibility into Total Spend ($31.5B) and Critical Flags (Approval Delay).

Operational View (Charts):

- Slicer Interactivity: Allows the user to drill down by Department (e.g., selecting "Transportation" instantly filters vendor lists and trends).
- Trend Analysis: The "Yearly Spending Trend" chart helps officials forecast future budget needs based on historical spikes.



Recommendations

01.

Diversify the Vendor Ecosystem:
Action: Break down "Mega-Contracts" (like the $4B+ healthcare spend) into smaller bundles to encourage bidding from mid-sized vendors and reduce the "Too Big to Fail" risk.

02.

Implement "Express Lane" Approvals:
Action: The 805-day average delay is critical. Create a fast-track approval process for standard, low-value contracts (<$50k) to reduce the backlog.

03.

Cap "Blanket" Contracts:
Action: Limit "Depends Upon Requirements" contracts to a fixed % of the budget (e.g., max 20%) to prevent unchecked spending creep.

Impact & Value

Financial Impact:

Increasing vendor competition by 10% could yield estimated savings of $1.5 Billion (5% of total spend).

Operational Impact:

Reducing approval delay from 800 days to 400 days would save thousands of administrative man-hours annually.

Governance:

Real-time monitoring of "Negative Modifications" allows for early intervention before contracts fail.

Limitations & Next Steps

Limitations:

- Granularity: The dataset provides contract-level totals but lacks line-item details (we know who got paid, but not exactly which items were bought).
- Historical Gaps: Data pre-2010 has inconsistent fields compared to recent entries.

Next Steps:

- Integrate "Line Item" procurement data for deeper unit-price analysis.
- Automate the data pipeline to refresh the dashboard weekly instead of static CSV uploads.

Thank you very much!

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