



Analytics Suite

Vendors Module

Prepared for: City Auditor's Office, City of Tulsa

Prepared by: 9b

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Project Overview

Why this project was completed:

The City of Tulsa depends on vendors big and small to supply equipment, vehicles, technology, and other services to operate smoothly. It is crucial to maintain a clean vendor master file to support procure-to-pay processes and vendor-employee relationships, and to protect the City against potential fraudulent activity and cash leakage.

9b automated analysis of thousands of MUNIS data points to assist the team maintaining vendor records in the ERP system and help internal auditors identify potential risks to the City's payment functions. 9b built an interactive Tableau dashboard that locates and details vendor-related risks as they arise and accumulate in the process.

How this project benefits the City:

- **Auditors:** Pinpoints risks occurring in the process resulting in efficient, frequent, and focused audits.
- **Managers:** Details process performance and inspires solutions to reach strategic goals.
- **ERP Administrators:** Targets employee training opportunities and informs system improvements.

Scope

Create data analytics and visualizations for automated oversight of City of Tulsa vendors.

Objectives

- Identify and detail the risks occurring in vendor maintenance by process step.
- Reduce complexity of MUNIS, enabling stakeholders to monitor process performance and make data-driven decisions.
- Collaborate with stakeholders to deliver the highest value throughout development of the Analytics Suite. *See Page 7.*

Methodology

- Read internal literature and explore the data environment.
- Interviewed City staff to understand procedures and priorities.
- Documented the vendor maintenance process and assigned risks to each step.

Results

- **19 data analytics** track key steps in the vendor maintenance process, flagging vendors as they move through workflow and accumulate risks.
- **Interactive process dashboard in Tableau** visualizes the vendor maintenance process and surfaces high-risk analytics by step. Analytics can be filtered to show results according to a given time period. Risks flagged in the process are supported by details curated for each analytic.
- **Key performance indicators in Tableau** show accumulated risk scores by MUNIS update, by vendor, by employee, by approver, and by department. *See Exhibits starting on Page 4.*

Background

The City of Tulsa has nearly 5,000 unique records in its vendor master file, which is stored in the MUNIS financial system and jointly owned by Accounts Payable and Purchasing divisions. These records include one-time vendors, non-financial vendors, inactive vendors, and purchasing cards.

With the exception of select staff in Accounts Payable and Purchasing, two employees primarily create new records and update existing records in MUNIS. The Office Administrator II and Purchasing Contracts Coordinator estimate that they receive 20 internal and/or external vendor maintenance requests each week.

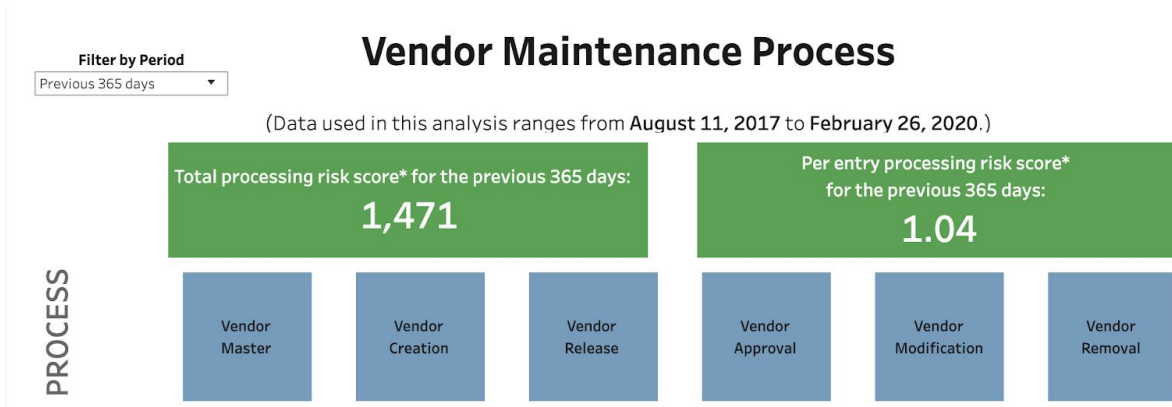
Before vendor setup in MUNIS, the potential vendor is required to complete a registration form and W-9. As a control, the entry clerk confirms the tax identification number of the applicant for a match on the Internal Revenue Service website. The entry clerk then creates a record for the potential vendor in MUNIS and releases it for approval. Two levels of approval—one in Purchasing and one in Accounts Payable—are required. Once approved, the vendor can be modified, deactivated, and removed from the system per request. There is no current protocol for removing inactive vendors, however, as money cannot be charged to them.

Leveraging vendor data will allow the City to eliminate errors, close information gaps, and improve records over time. Additionally, this project is designed to accommodate changes in vendor maintenance, which are anticipated with the implementation of Vendor Self-Service.

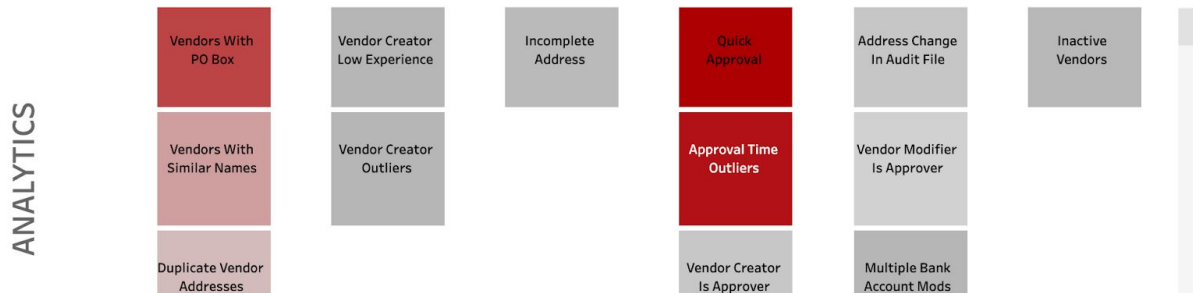
Exhibit: Tableau Dashboards

The vendor maintenance dashboard in Tableau visualizes the process in three interactive sheets.

- The **Process Sheet** breaks down by step. **Filter by Period** shows analytic results from the previous 7 days, 30 days, 365 days, fiscal year, or previous month (e.g. Previous January).



- The **Analytics Sheet** shows each analytic directly below its related process step. Shading indicates each analytic's risk score (assigned weight multiplied by the number of exceptions).



- The **Details Sheet** provides transaction details, which allow the user to understand what conditions triggered the analytic. Details are hidden until an analytic is selected.

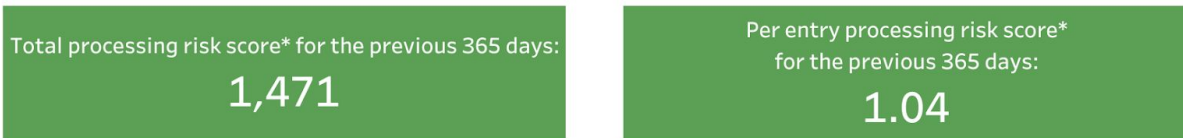
ID	Count	Employee Name	Employee Department	Date of Input	Approver Name
1952	14	[Redacted]	Fin	July 11, 2019	[Redacted]
3711	14	[Redacted]	Fin	September 20, 2019	[Redacted]
6843	14	[Redacted]	Fin	July 17, 2019	[Redacted]
7212	14	[Redacted]	Fin	March 13, 2019	[Redacted]

Additional views

The vendor maintenance process dashboard features two additional views for deeper risk analysis.

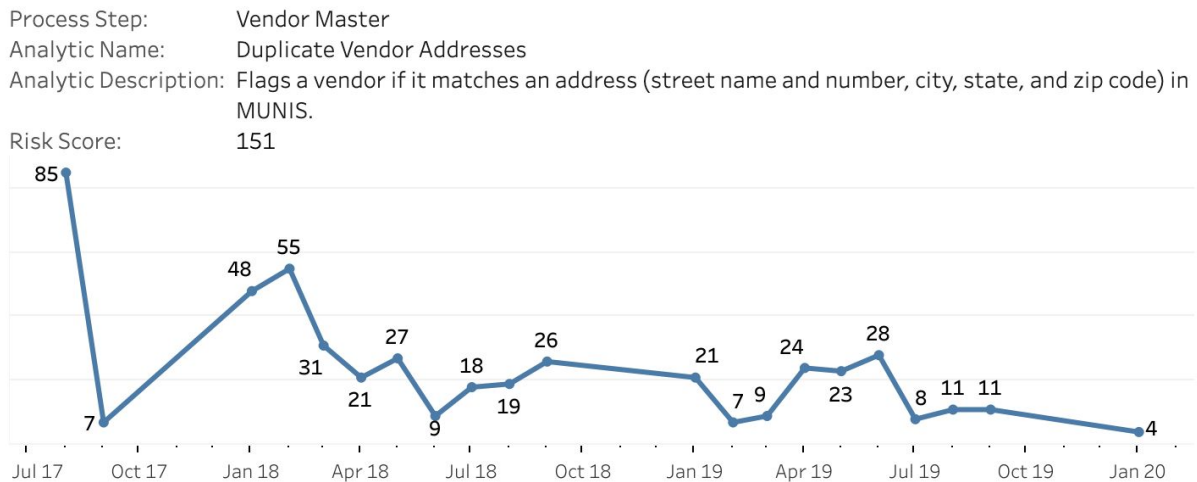
Dynamic Filters

When a user filters the analytic results by period, this pair of green boxes dynamically responds by showing the **total risk score** and the **per entry risk score** vendor processing for the given time period. (The example below shows the results from the previous 365 days of the latest data refresh.)



Trend Tooltip

When a user hovers over an analytic box, a tooltip displays a trend line graph that shows the monthly total of occurrences that the particular analytic was flagged.

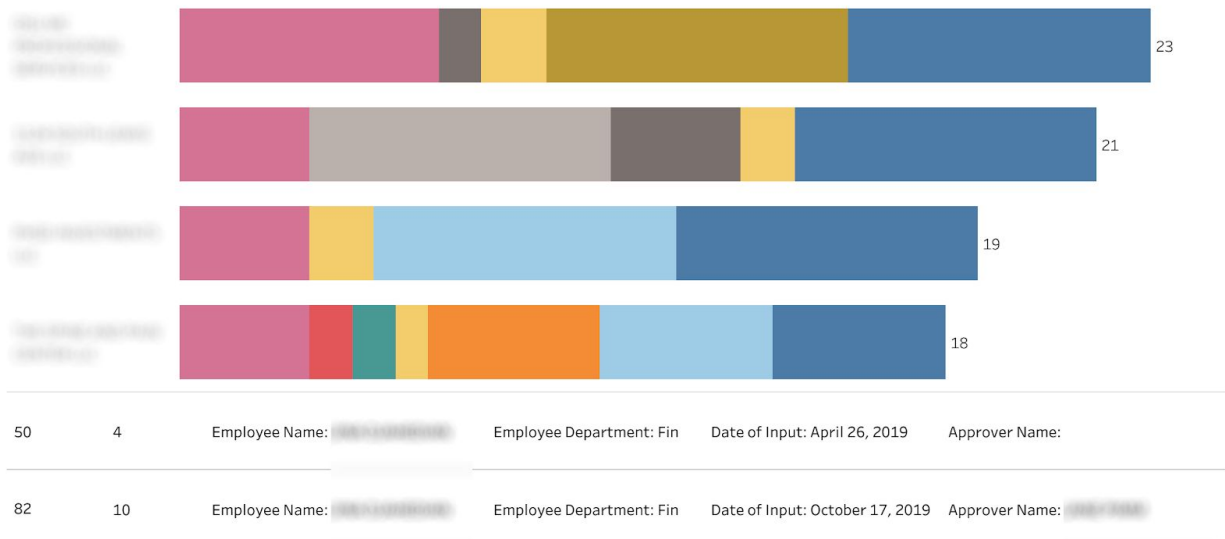


Risk Scores

A set of KPIs shows accumulated risk scores **by update, by vendor, by employee, by approver** and **by department**. Below: The user can quickly see which invoices have the highest risk, which accumulates as they move through the process. Results change according to selected time period.

Vendor

This chart shows vendors with the highest accumulated risk scores.
Click each color in the stacked bar graph to learn more.



Multipliers

The user can perform sensitivity analysis by assigning different multipliers to all 19 vendor-related analytics and seeing the outputs change across the entire Module. This allows users to model strategic management decisions and review the predictive results of those decisions.

Analytics		Multipliers
1 Duplicate Vendor Addresses	Enter a multiplier to adjust the total risk score of an analytic.	<input type="text" value="1"/>
2 Vendors With Similar Names	Enter a multiplier to adjust the total risk score of an analytic.	<input type="text" value="1"/>
3 Vendor Name Keywords	Enter a multiplier to adjust the total risk score of an analytic.	<input type="text" value="1"/>
4 Vendors With PO Box	Enter a multiplier to adjust the total risk score of an analytic.	<input type="text" value="1"/>
5 Benfords Law	Enter a multiplier to adjust the total risk score of an analytic.	<input type="text" value="1"/>
6 Vendor Emp Bank Match	Enter a multiplier to adjust the total risk score of an analytic.	<input type="text" value="1"/>

Exhibit: Analytics Suite

Vendors is the sixth Module in an Analytics Suite being developed by 9b for the City of Tulsa.

