

# Dowdle Capstone Project Report

Brittany M.D. Dowdle

Northwest Missouri State University  
School of Computer Science and Information Systems  
Maryville MO 64468, USA  
S574362@nwmissouri.edu

**Abstract. Keywords:** procurement · compliance · prediction · product

## 1 Introduction - link GitHub and Overleaf report

This project explores procurement performance using real-world data; the goal is to predict whether a purchase order will result in supplier compliance. Order compliance is critical in performance metrics. It reflects whether supplier contracts are meeting agreed-upon delivery schedules, product quality, and pricing terms. By building a predictive model based on features such as quantity, price deviation, or defect rates, the objective is to provide procurement teams with data-driven insights. This could predict risk, improve supplier relationships, and enhance operational efficiency.

### 1.1 Goal of This Project

The final deliverables from this project will include:

- Machine learning model predicting order compliance (including data visualizations [4])
- A PDF report written in LaTeX via Overleaf
- A fully documented GitHub repository with Jupyter notebooks (including EDA [4])

### 1.2 Project Resources

- **GitHub Repository:** [https://github.com/Bdowdle4/Dowdle\\_Analytics\\_Capstone](https://github.com/Bdowdle4/Dowdle_Analytics_Capstone)
- **Overleaf Report:** <https://www.overleaf.com/read/bszyhdxsnrsf>
- **Pro Analytics 01:** <https://github.com/denisecase/pro-analytics-01>  
The guide used to follow a repeatable workflow for professional python projects [1]

## 2 Collect and Describe Data

The data used contains key procurement metrics that reflect supplier performance, order accuracy, and pricing effectiveness. Each row represents a purchase order or PO. Some attributes include dates, item category, quantity, price, defects, and whether the supplier was compliant or not.

### 2.1 Domain and Professional Description

Domain: Business Operations Subdomain: Procurement / Supply Chain

This project would be important to:

1. Supply Chain Analysts
2. Procurement Managers
3. Chief Purchasing Officer (CPO)

Procurement professionals use analytics to track KPIs such as on-time deliveries, cost savings, and defect rates to measure supplier performance. When a supplier consistently does not meet the expected performance level, they are a financial and operational risk. Suppliers can be considered non-compliant for late deliveries, defective products, and violations of negotiated pricing. By identifying patterns in procurement data and predicting compliance outcomes, organizations can optimize sourcing strategies, negotiate better contracts, and minimize risk exposure. [3]

### 2.2 Dataset Resource

**Procurement KPI Analysis Dataset:** [2]

<https://www.kaggle.com/datasets/shahriarkabir/procurement-kpi-analysis-dataset>

Format: CSV file with an average of 10 key features per PO

Column Summary:

- **po\_id**: Unique purchase order ID
- **supplier**: Supplier name
- **order\_date**, **delivery\_date**: Date fields for lead time calculation
- **item\_category**: Categorical variable
- **order\_status**: Text field, could include status like "delivered", "pending"
- **quantity**, **unit\_price**, **negotiated\_price**: Numerical order and cost metrics
- **defective\_units**: Integer count of defected items
- **compliance**: Target variable for prediction (binary or categorical)

### 3 Clean and Prepare Data

#### 3.1 Data Formats

#### 3.2 Null Handling

#### 3.3 Outliers

#### 3.4 Jupyter Notebook

### 4 Exploratory Data Analysis (EDA)

#### 4.1 Trend Line Charts

#### 4.2 Correlation Matrix

#### 4.3 Vendor Comparisons

### 5 Model and Generate Insights

#### 5.1 Chosen Models

#### 5.2 Parameters

#### 5.3 Metrics

### 6 Present Results

#### 6.1 Summarize KPIs

#### 6.2 Plot Model Predictions

#### 6.3 Maybe Dashboard Style Visuals?

### 7 Finalize Deliverables

#### 7.1 GitHub Repo Completeness

#### 7.2 Overleaf Report Completeness

#### 7.3 Limitations

#### 7.4 Future Work

### 8 Giving Credit Where It's Due

### References

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