Supplier Selection Analytics Report

This analysis examines 3,089 procurement records to understand the factors influencing supplier selection. The dataset includes detailed operational KPIs, cost metrics, delivery performance indicators, categorical classifications, and engineered features such as risk, value, price, lead-time, and fulfillment categories.

Across descriptive statistics, category distributions, numeric comparisons, and correlation analysis, the findings consistently show that supplier selection is not driven by any single numeric KPI. Instead, selection decisions appear to be multi-factor, threshold-based, and influenced more by categorical performance patterns than by raw numeric values.

1. Overall Supplier Selection Behavior

- 50.5% of suppliers were selected, and 49.5% were rejected, indicating a balanced decision process with no systemic bias.
- Key operational averages (price, defect rate, delivery time, on-time rate, return rate, forecast accuracy) show minimal differences between selected and rejected suppliers.
- This suggests that selection decisions are not based on linear numeric thresholds, but rather on a combination of qualitative and categorical factors.

2. Descriptive KPI Insights

The dataset shows stable and consistent operational behavior:

- Avg price/unit: 274.7
- Avg defect rate: 4.99%
- Avg on-time delivery rate: 84.85%
- Avg delivery time: 14.96 days
- Forecast accuracy: 80.10%
- Supplier reliability score: 50.53%

No major anomalies or inconsistencies were detected across numeric fields

3. Category-Based Performance Patterns (Most Insightful Section)

While numeric KPIs show minimal differences, categorical KPIs reveal clear behavioral patterns.

Risk Category

- Extreme Risk suppliers are overwhelmingly rejected.
- Low/Medium Risk suppliers show higher selection rates.

Value Category

- Good and Excellent value suppliers are more likely to be selected.
- Poor value suppliers are split almost evenly.

Price Category

- High and Medium price suppliers have similar selection rates.
- Low price suppliers are not necessarily preferred.

This indicates that price is not a primary driver of selection.

Lead-Time Category

- Surprisingly, Highly Inconsistent suppliers are selected more often.
- This suggests that lead-time variability may be tolerated if other KPIs compensate.

Fulfillment Category

- Over-delivery (>100%) is strongly associated with selection.
- Critical (<80%) fulfillment is split evenly.
- World-Class (97–100%) fulfillment shows mixed selection behavior.

This implies that fulfillment behavior is evaluated in context, not in isolation.

4. Numeric KPI Comparison (Selected vs Rejected)

Across 17 numeric KPIs, the differences between selected and rejected suppliers are extremely small:

- Most differences fall between 0% and 3%
- No KPI shows a strong directional influence
- This confirms that selection decisions are not driven by raw numeric values

KPI	Difference	Interpretation
defect_rate	–4.18%	Slightly lower for selected suppliers
delivery_time_days	+0.86%	Negligible difference
forecast_accuracy	–0.78%	Negligible difference
avg_order_volume	–1.9%	Slightly lower for selected suppliers
supplier_reliability_score	+1.22%	Slightly higher for selected suppliers

These differences are too small to be operationally meaningful.

5. Correlation Analysis (Screening Tool)

Correlation values between each KPI and the selection flag (0/1) range from –0.035 to +0.038, which is extremely weak.

This is expected because:

- Binary outcomes compress variance
- Supplier selection is not linear
- Many KPIs are categorical or threshold-based
- Procurement decisions involve multiple interacting factors

Still, the correlation table provides directional hints:

Weak negative correlations (slight rejection tendency):

- defect_rate
- forecast_accuracy
- offer_validity_days
- fulfillment_ratio
- total_cost_impact

Weak positive correlations (slight selection tendency):

- order_accuracy
- supplier_reliability_score

These effects are small but directionally consistent with procurement logic.

6. Final Interpretation: What Drives Supplier Selection

Based on all analyses, supplier selection appears to be driven by:

1. Category-level performance patterns

Risk, value, fulfillment, and price categories show clear behavioral signals.

2. Multi-factor evaluation

No single KPI dominates the decision.

3. Threshold-based logic

Suppliers are likely evaluated against internal cutoffs (e.g., “reject if risk is extreme”).

4. Contextual trade-offs

A supplier with inconsistent lead time may still be selected if value or fulfillment is strong.

5. Nonlinear decision behavior

This explains why correlation is weak and numeric differences are small.

7. Recommendations for the Business

1. Strengthen category-based scoring models

Risk, value, and fulfillment categories are the strongest predictors of selection.

2. Introduce threshold rules

For example:

- Reject if risk = Extreme
- Flag if fulfillment < 80%
- Prioritize Good/Excellent value suppliers

3. Build a composite supplier score

Combine:

- Risk category
- Value category

- Fulfillment category
- Order accuracy
- Total cost impact

4. Use logistic regression or decision trees for deeper insights

These models can reveal:

- Hidden nonlinear patterns
- KPI interactions
- True drivers of selection

5. Standardize selection criteria

The analysis shows inconsistent patterns (e.g., inconsistent lead time suppliers being selected).

A standardized scoring model would improve fairness and consistency.

8. Final Conclusion

Supplier selection in this dataset is balanced, multi-factor, and driven more by categorical performance patterns than by raw numeric KPIs.

No single metric strongly predicts selection, but risk, value, fulfillment, and cost-related categories provide meaningful signals.

A structured scoring model would enhance consistency and transparency in future procurement decisions.