Detection of Fraud in Procurement of Big Data using Scalable Tools

WHAT IS PROCUREMENT?

Procurement is the act of obtaining or purchasing goods or services, typically for business purposes. Procurement is most commonly associated with [businesses](https://www.investopedia.com/terms/b/business.asp) because companies need to solicit services or purchase goods, usually on a relatively large scale. It can also include the overall procurement process, which is critically important for companies leading up to their final [purchasing](https://www.investopedia.com/articles/investing/010914/importance-purchasing-managers-index-pmi.asp) decision.

**PROCUREMENT FRAUD:**

Procurement fraud can be defined as dishonestly obtaining an advantage, avoiding an obligation or causing a loss to public property or various means during procurement process by public servants, contractors or any other person involved in the procurement.

Procurement fraud stretches across different types of activities, such as falsification or magnification of a need for a product or service, an RFP drafted to favor a vendor, splitting the purchase to fall within thresholds, favoritism by issue a contract on a party nomination basis, there could be instances of collusion with procurement functions in ways that compromise the fairness of the procurement process resulting in higher contract costs.

**E-GROCERIES DOMAIN:**

Consumer market companies tend to have several third-party touch-points, such as vendors/ suppliers, transporters, third-party manufacturers or subcontractors, packers, stockists, distributors or other third-party service providers, that can significantly increase the risk of collusive frauds that are difficult to detect.

Protection of the brand from unauthorized online sale by third-party sellers, who may sell branded products at highly discounted prices, usually obtained through leaks in the supply chain. Various market studies indicate that counterfeiting of consumer products and economic adulteration of food products shaves off at least over INR 1,000 crores from the Indian exchequer annually. Also, brands can lose up to 20 percent of their market share and roughly 10 percent of their revenue and profit due to counterfeit products in India.

Procurement frauds can take place between two stages:

1. Pre-contract frauds
2. Post-contract frauds

PRE-CONTRACT FRAUDS:

Frauds during Bidding Process also called as Bid Rigging:

When there is collusion between procurement personnel and bidders or among a number of bidders where they collaborate to drive prices higher.

**Bid Suppression**: Bid-suppression schemes involve agreements among competitors in which one or more companies agree to refrain from bidding or to withdraw a previously submitted bid so that the designated winner’s bid will be accepted.

**Complementary Bidding:** One or more parties will submit a non-competitive bid (intentionally overpriced), to ensure that another organization will win.

**Bid Rotation Scheme:** In bid rotation, all co-conspirators submit bids, but by agreement, take turns being the low bidder on a series of contracts.

**Phantom Vendor Scheme:** Creating dummy companies to submit a variety of bids on a single contract.

**When a procurement employee personally benefits from choosing a vendor, they might:**

* Tailor contract requirements so only their vendor meets them all perfectly
* Choose a new vendor over others that the organization has used before
* Leak contract information to their vendor before bidding is open
* Not open bids publicly
* Accept a late bid or re-bid from their vendor
* Disqualify the real winning vendor for minor reasons so they can accept their vendor’s bid
* Purchase more goods/services than needed to receive more kickbacks

**POST-CONTRACT FRAUDS:**

**Conflict of Interest:** A conflict of interest occurs when an entity or individual becomes unreliable because of a clash between personal (or self-serving) interests and professional duties or responsibilities. Such a conflict occurs when a company or person has a [vested interest](https://www.investopedia.com/terms/v/vestedinterest.asp)—such as money, status, knowledge, relationships, or reputation—which puts into question whether their actions, judgment, or decision-making can be unbiased.

**Budget Splitting:** Employees involved in frauds splits large budget amounts into two-three splits as it decreases the authority required to sanction the budget plans.

**Erroneous Invoice schemes:** Suppliers either on their own or by colluding with the project staff inflate invoices, create false invoices or provide duplicate invoices for goods and/or services.

**Failure to meet contract specifications**: Resulting in substandard products and sometimes dangerous goods.

**Grey Market:** Where companies can suffer losses through counterfeit and knock-offs or where suppliers generate unauthorized production putting a company’s real products at risk.

**Fake Quality Report:** Employees falsify quality reports of goods to receive kickbacks from vendors.

**ROLE OF PROCUREMENT ANALYST:**

A procurement analyst can lean on advanced analytics techniques such as Data Mining, Text Mining, Anomaly Detection, and Network Analysis to arrest or reduce the incidence of these kinds of fraud.

Procurement analyst can help with:

* Flagging suspicious transactions that might go undetected.
* Determining the possibility of split purchase orders, duplicate payments etc.
* Identifying possible buyer-vendor collusions.
* Addressing inefficiencies in the procurement process by identifying differential pricing for similar items.
* Leveraging predictive modeling to identify attributes or patterns that are correlated with known fraud.

In order to create a good predictive model, we need data which contains past transactional data of the company with fraud transactions included.

The Features required are:

1. Invoice Date
2. Invoice Number
3. PO number
4. Unit Price
5. Contract (Yes/ No)
6. Market Price
7. Approving Party
8. Supplier
9. Product
10. Quantity