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INTRODUCTION

Document Purpose
The purpose of this document is to describe Key Performance Indicators (KPIs) and goals of a company's procurement division. All attempts have been made in using Procurement terminology while describing the KPIs in this document.

Intended Audience
The main intended audience for this document are the business owners of the Procurement division in a Manufacturing industry. The Procurement dashboard deals with managing the purchasing of goods and raw material in a business from the time the need is identified, to when the goods and services are received. Thus the business owners must be able to verify that their 'Key Performance Indicators' have been documented here completely, accurately and unambiguously.

Define Success
Most of the cost analysis in one's business comes through the procurement gateway. This is a key area to save cash. Thus one of the success parameters would be Cost saving. The other parameters would be pinpointing the fact that choosing an eProcurement system would be a better option than a non-eProcurement system and incorporating accurate and complete data. Having less lead time in the procurement will add up cost saving in the complete process.

Define Failure
Failure in this case would mean inability to drill down to a specific area of interest, basically not empowering the managers or the concerned authority to assess the data effectively and coming up with a better decision. Since it is the procurement division, budget estimation is an important factor. Thus over or under estimating the budget can prove to be a failure.

Define Goals
The ultimate goal shall be Procuring the right quantity with right quality at right time and right price.

Determine Current Key Business Issues
Collected the business issues faced in the IFFCO procurement division like

- Company wanted to do proper forecasting of the market, as till now data available is in excel, json or html files. Consolidating all the procurement process and building data ware house is a major step
- Company wanted to compare department wise, product wise, vendor wise, buyer wise details about the efficiency and deficiency details.

Assumption
The project is conceptualized on the business goals of IFFCO, which is the world's largest fertilizer cooperative federation based in India. The Procurement division has been taken into account to address the business issues.

- The data for Buyer, vendor, user and transporter has been fed by the team as this data was not provided by the organization due to confidentiality concerns
- The enquiry by Vendor is based on a two stage analysis
- AVL (Approved Vendor List) codes have been assigned to the Vendors. RFQ is issued only to Vendors who are in the Approved Vendor List
- Inventory analysis is done monthly wise
- Early delivery: Goods delivered 1-10 days before the shipment date
- Late delivery: Goods delivered 1-30 days after the shipment date

PROJECT PLANNER

Activity	Assigned to	Plan Start	Plan end	Actual Start	Actual Duration	Percent Complete
Project charter creation	Yashaswini	21-Sep-2016	27-Sep-2016	21-Sep-2016	27-Sep-2016	100
Project Planning	Team	28-Sep-2016	04-Oct-2016	28-Sep-2016	04-Oct-2016	100
Stake holder analysis	Mohan	05-Oct-2016	11-Oct-2016	05-Oct-2016	11-Oct-2016	100
Requirement Gathering	Team	19-Oct-2016	31-Oct-2016	19-Oct-2016	31-Oct-2016	100
Requirement Analysis	Team	02-Nov-2016	08-Nov-2016	02-Nov-2016	08-Nov-2016	100
Scoping of the project	Team	09-Nov-2016	15-Nov-2016	09-Nov-2016	15-Nov-2016	100
Creation of project documentation	Team	16-Nov-2016	22-Nov-2016	16-Nov-2016	22-Nov-2016	100
Creation of KPIs	Team	16-Nov-2016	22-Nov-2016	16-Nov-2016	22-Nov-2016	100
Creation of Bus Matrix	Yashaswini	23-Nov-2016	29-Nov-2016	23-Nov-2016	29-Nov-2016	100
Tool Selection	Saatchi	23-Nov-2016	29-Nov-2016	23-Nov-2016	29-Nov-2016	100
Filtering of Data	Saatchi	30-Nov-2016	03-Dec-2016	30-Nov-2016	03-Dec-2016	100
ETL in Talend	Yashaswini	30-Nov-2016	03-Dec-2016	30-Nov-2016	03-Dec-2016	100
Dimensional Modelling	Yashaswini	23-Nov-2016	29-Nov-2016	23-Nov-2016	29-Nov-2016	100
Visualization in Tableau	Mohan	30-Nov-2016	03-Dec-2016	30-Nov-2016	03-Dec-2016	100
Forecasting with Tableau and R	Mohan	30-Nov-2016	03-Dec-2016	30-Nov-2016	03-Dec-2016	100

BUS MATRIX

BUSINESS PROCESS	ATOMIC GRANULARITY	METRICS	DATE	APPROVED_VENDOR_LIST	BUYER	COST_CENTRE	DEPARTMENT	ENQUIRY_STAGES	PRODUCT	TERMS&CONDITIONS	TRANSPORTER	USER	VENDOR	VIOLATION
MATERIAL PURCHASE REQUISITION	One row per MPR	Quantity, Estimated_Unit_Price	X	X		X	X		X			X		
REQUEST FOR QUOTATION	One row per RFQ	Quantity, No_Of_Vendors_Enquiry_Issued, No_Of_Bids_Received	X	X	X		X	X	X				X	
PURCHASE ORDER	One row per PO	Quantity, Unit_Price, Discount, P&F_Charges, Taxes, Freight_Charges, Delivery_Period	X		X	X	X		X	X			X	
PURCHASE ORDER SHIPMENT RECEIPT	One row per PO Shipment	Accepted_Quantity, Rejected_Quantity	X						X		X			
QUANTITY ON HAND	One row per QOH	Quantity_On_Hand	X						X					
VENDOR MANAGEMENT	One row per Vendor Blacklist	Vendor_Penalty	X										X	X

DEFINE KEY PERFORMANCE INDICATORS (KPIS)

- **Cost estimation, saving and avoidance:** Since most of the cost in one's business comes through the procurement gateway. This is a key area to save cash. Thus anything ranging from estimation, saving and avoidance of cost can be taken into consideration as a KPI.

  Cost avoidance is a cost reduction that results from a spend that is lower than the spend that would have otherwise been required if the cost avoidance exercise had not been undertaken
  Cost avoidance = Actual Purchasing Price – Lowest Price Quoted

  Cost Reduction = Actual Purchasing Price – Last Price Paid

- **eProcurement:** Since an eProcurement system is a fully capable electronic web application for purchasing goods and services, it is an entity that an organization would want to incorporate in its system, making it an important KPI.

- **Lead Time:** In procurement, lead time includes the first effort to initiate acquisition of goods or services, up to the time of placement of order. Procurement lead time includes identifying a need, selecting a good or service and sourcing vendors, in addition to time spent negotiating, ordering and paying.

- **Requisition to PO value:** Departments in some small businesses need to order supplies through the financial arm of the business rather than buying the supplies on their own. This process includes the use of both requisition orders and purchase orders, which represent different steps of the same purchasing process.

- **Quality:** Quality can be defined by the following equation given below:
  Supplier Quality Rating = (Lots Accepted/Lots Inspected) x (Samples Accepted/Samples Inspected) x 100

- **Vendor Performance:** The value of measuring the performance of external suppliers, distributors etc. is well known; understanding current performance, comparisons of performance over time and using data to better understand areas for performance improvement are benefits of developing as assessing KPIs.

- **Contract compliance:** This KPI measures compliance to Contract Service Level Agreements(SLA's), contract terms and conditions, and pricing agreements

- **Shipment Tracking:** This KPI takes into account the vendor management. We have been evaluating the lead and lag time of the product

QUERIES

eProcurement Analysis

1. Percentage of vendors who are responding through eProcurement and without eProcurement?
2. How many quotations we are receiving within 1st due date?
3. How many RFQ's are being issued through eProcurement?
4. How many RFQ's were opened within 1st due date?
5. What is the percentage of RFQ due date's extended with and without eProcurement?
6. How is the Buyer's performance in terms of RFQ due date's extended with and without eProcurement?

Vendor Review Management

1. How do vendors rank by volume by item and revenue spent for last one year?
2. Vendors who are not supplying within delivery time?
3. Vendors who has not provided quality items?
4. Vendors who has provided maximum amount of discount?
5. What is the vendors count by product category?
6. What is the region of top 50 vendors in terms of procurement value?

Cost Saving

1. How many orders have lower PO value as compared to MPR value?
2. Total discount provided by all the vendors by month?

Orders Analysis

1. Issuance of PO's trend by product category and forecast for next 4 months?
2. Total value of orders by product category for each financial year?
3. Total value of orders by department category?
4. What is the department wise budget utilization?
5. What is the average cost estimation by department per MPR?
6. Number of MPR's each user with a specific position has issued?
7. What is the user performance in cost estimation?
8. No of single stage RFQ's and two stage RFQ's issued and the Lead Time for RFQ's with single stage and two stage?
9. What is the RFQ count by quarter by department?
10. What is the vendors' response within Due Date by quarter by department?

Lead Time Analysis

1 Count of PO's where Lead time is greater than 50 days by department?
2 What is the average lead time in each product category?
3 What is the maximum lead time in each product category?
4 Lead Time analysis by product category by buyer?
5 What is the Quantity on Hand trend by product category?

OLTP SYSTEM

The OLTP system for constructing the OLAP are
1.**The Material Purchase Request (MPR)** file had JSON format.
2.**Request for Quotation (RFQ)** data was in .xls format
3.**Purchase Order (PO)** html files.

ETL METHOD

It is a process in data warehousing responsible for pulling data out of the source systems and placing it into a data warehouse. ETL involves the following tasks:

Extraction

- MPR file has JSON format, extracted to xml then to excel using online converter
- RFQ had .xls format and catered to the previous years. We tweaked it for the latest year's rules for our project
- PO were of html format, extracted the info using PERL technology and corresponding PO details are captured to excel
- Format every source to excel file
- In the industry there will be daily jobs and Methods to extract the data as specified by the OLAP team
- Optimized for a single record access. i.e. for Operational efficiency. Quickly records a transaction

Transformation

- Determining Key fields to be considered for Transforming the data to load to OLAP system
- Mapping the data using Talend studio to load into Amazon Web service Oracle 12 Data Base
- Placed Null values to the empty field
- Mapped complete name to First Name and Second name column
- Format Conversions (YYYYMODA to Mo/Da/Yr)
- Derived Measures / Dimensions (% Total Amount, Rejected Quantity
- Chronology of Data

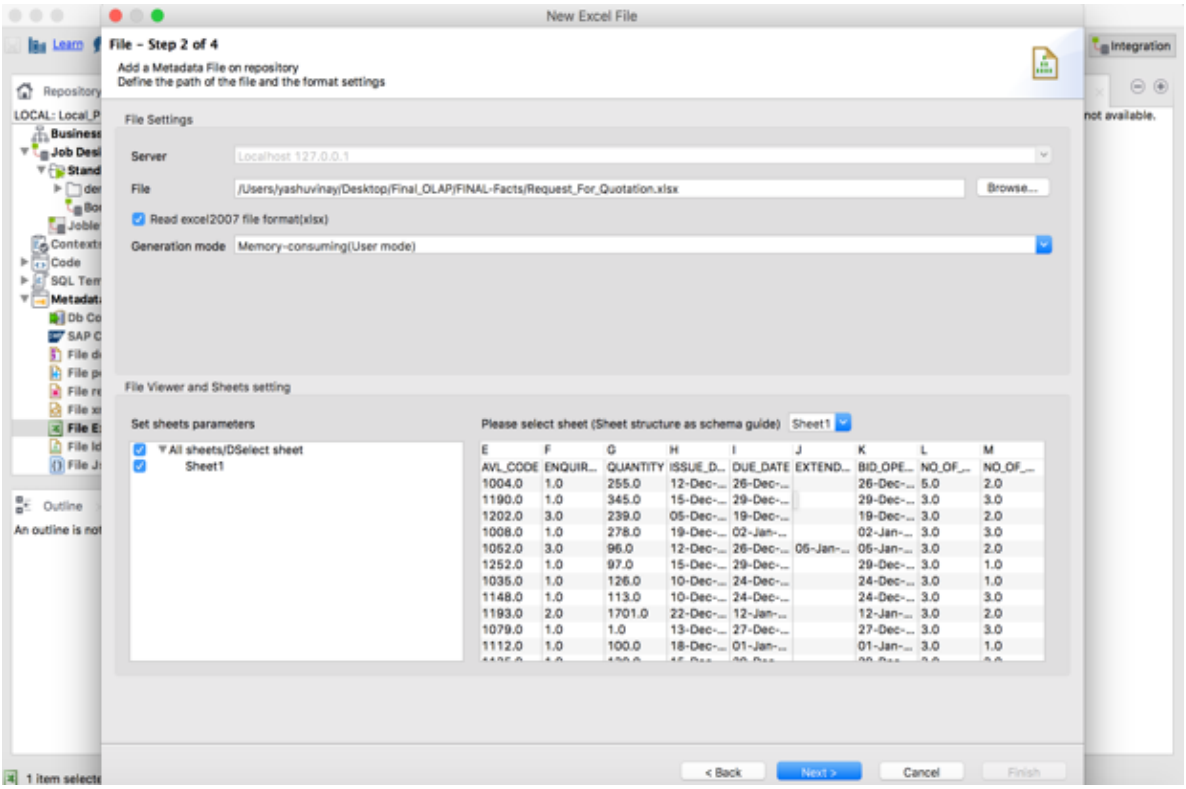
Loading

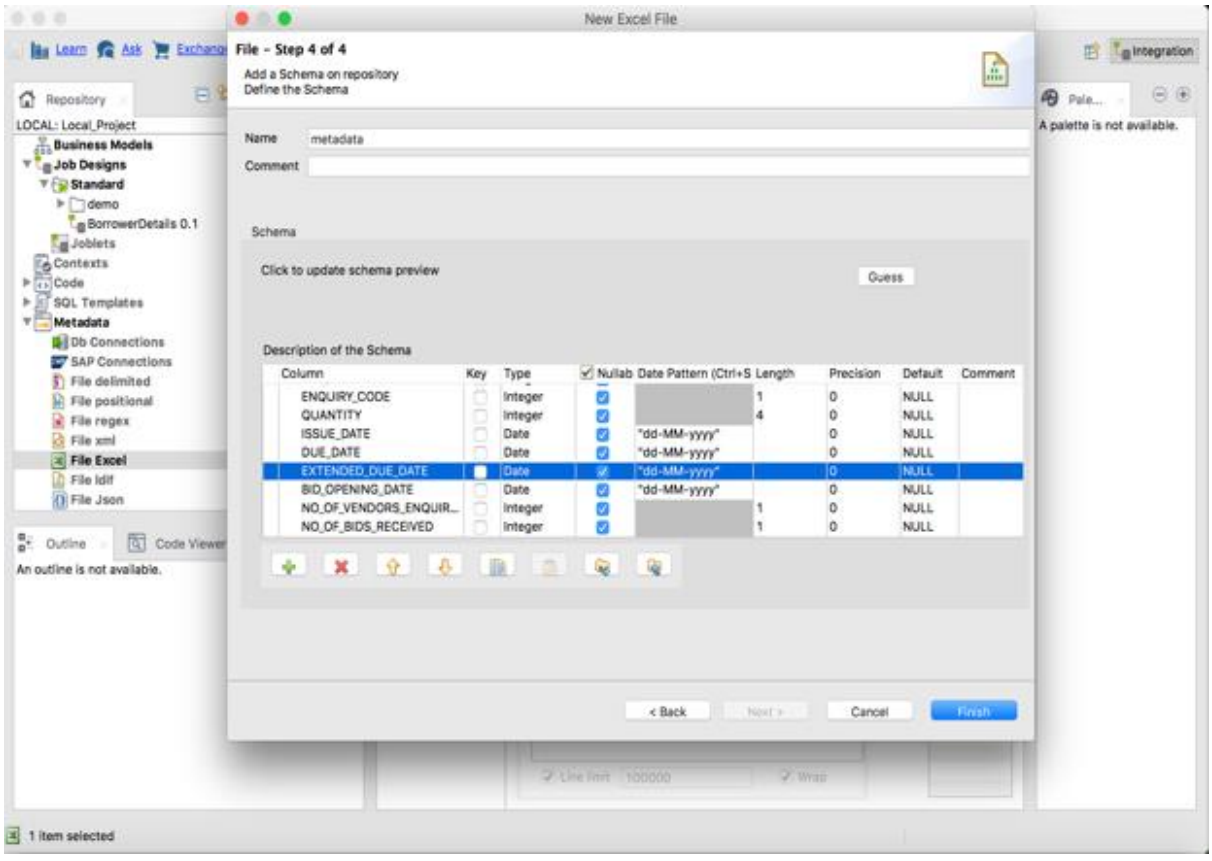
- Facts and Dimension Table
- Built Snapshot Fact table and Transaction Fact table
- Frequency taken daily, quarterly and yearly consolidation
- Removed Duplicates
- De-normalized the data according to the needs

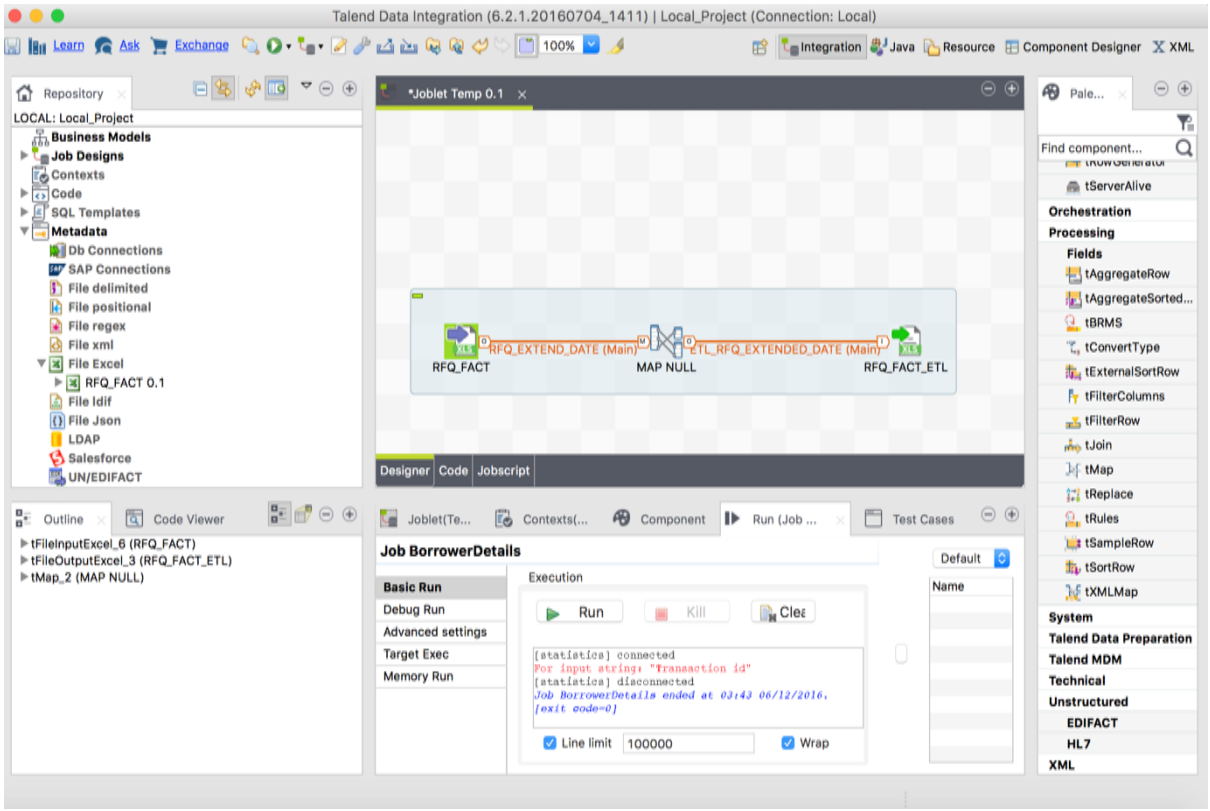
ETL Using Talend Studio Tool and Amazon Web Service

Talend Tool downloaded for Mac version. Fed the excel data, defined the schema, written the attribute data types and mapped according to the transformation requirement. Placed the extracted data to the excel format again.

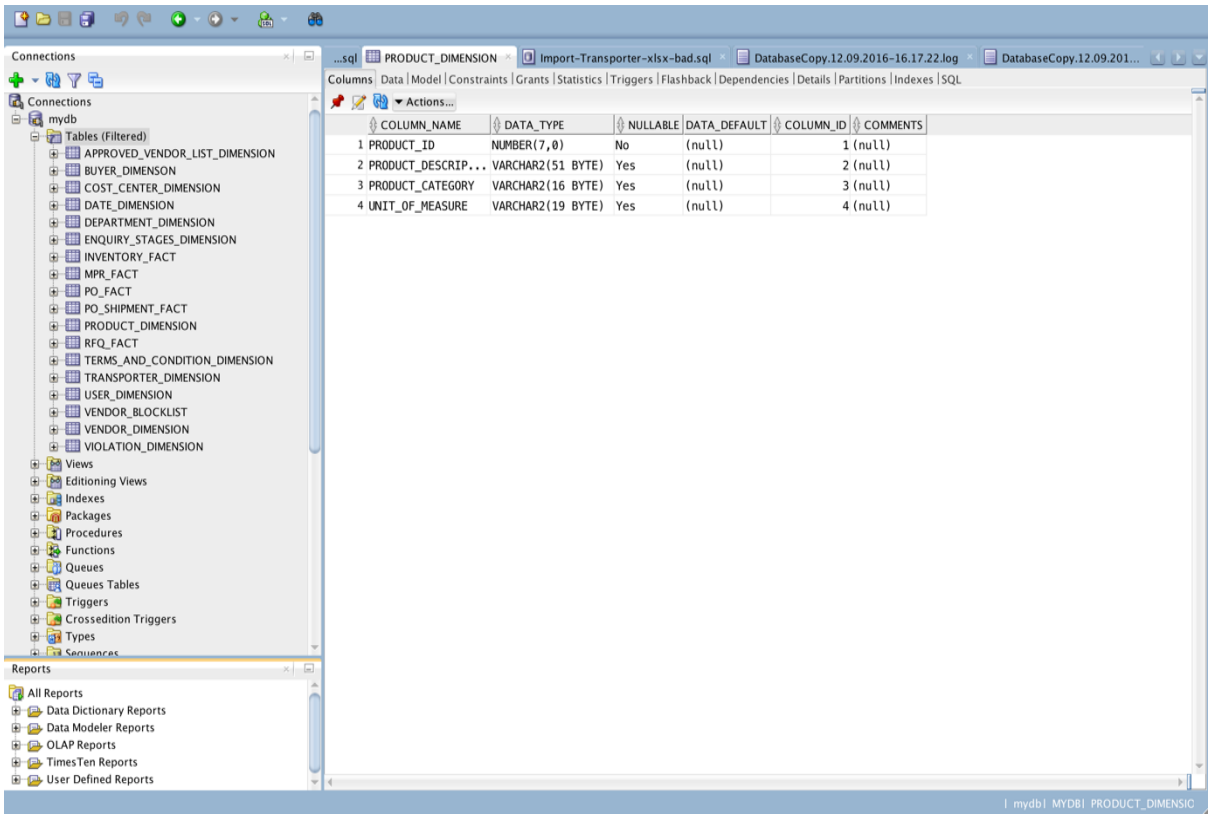
Taken the screen shot of formatting the 2 digit precision of the price and null values for the expected delivery date in RFQ Process


New Excel File
File - Step 2 of 4
Add a Metadata File on repository
Define the path of the file and the format settings
File Settings
Server
File
/Users/yashuvinay/Desktop/Final_OLAP/FINAL-Facts/Request_For_Quotation.xlsx
Browse...
Read excel2007 file format(xlsx)
Generation mode
Memory-consuming(User mode)
File Viewer and Sheets setting
Set sheets parameters
All sheets/DSelect sheet
Sheet1
Please select sheet (Sheet structure as schema guide)
Sheet1
< Back
Next >
Cancel
Finish


New Excel File
File - Step 4 of 4
Add a Schema on repository
Define the Schema
Name
metadata
Comment
Schema
Click to update schema preview
Guess
Description of the Schema
Column
Key
Type
Nullab
Date Pattern (Ctrl+S
Length
Precision
Default
Comment
ENQUIRY_CODE
QUANTITY
ISSUE_DATE
DUE_DATE
EXTENDED_DUE_DATE
BID_OPENING_DATE
NO_OF_VENDORS_ENQUIR...
NO_OF_BIDS_RECEIVED
< Back
Next >
Cancel
Finish
1 item selected

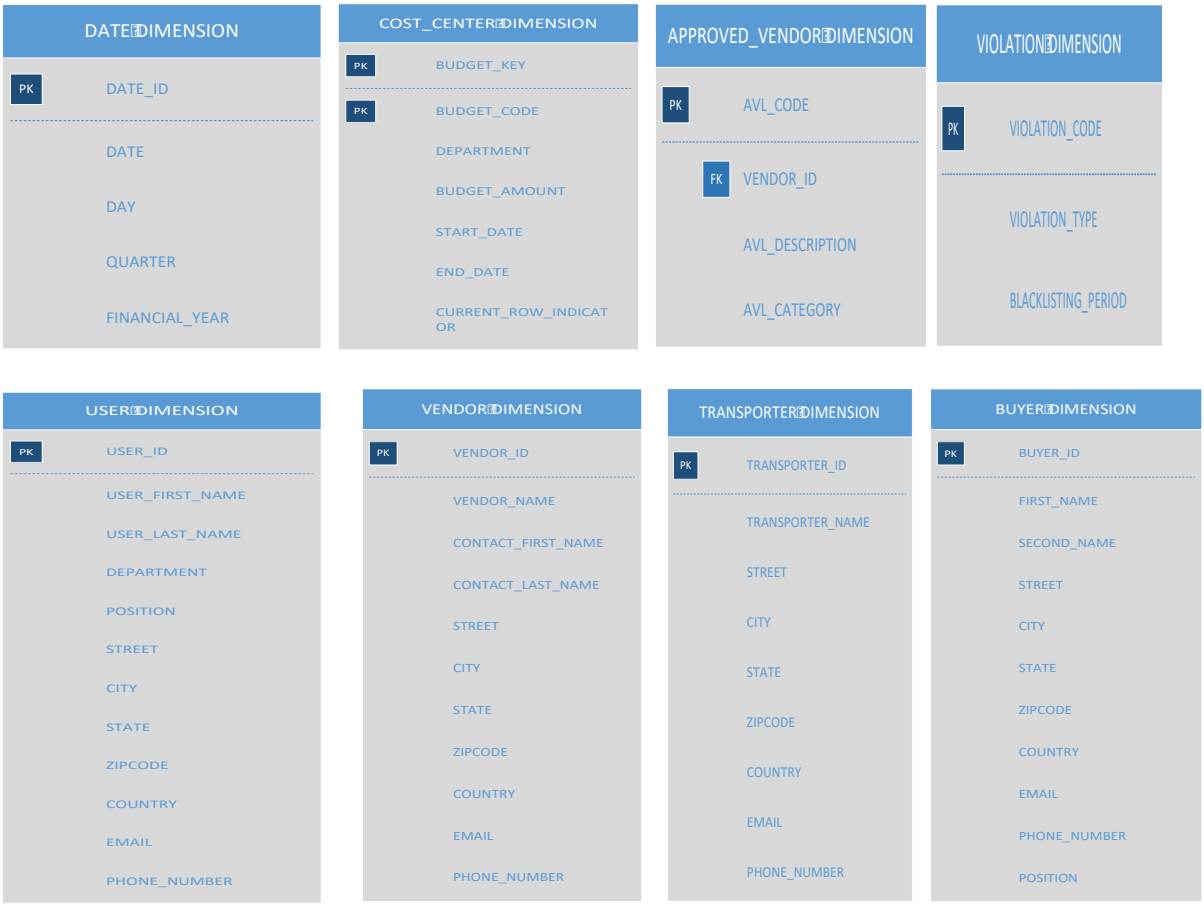


Loaded the data to the instance of RDS created on Amazon Web service (AWS) oracle 12 c
All the Dimension and Fact Table are loaded and established the referential integrity



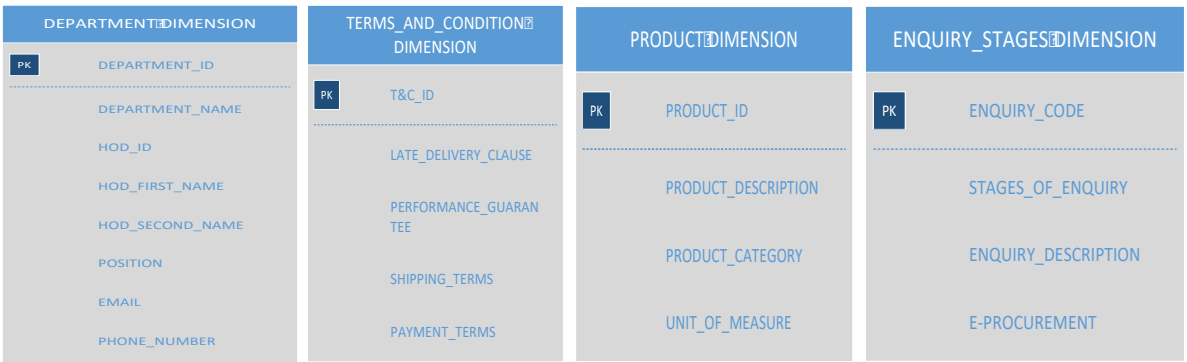
DIMENSIONAL MODELING

As a part of Conceptual Schema identified the following Dimensions.



Here Date dimension is formed for Day wise, quarterly wise and yearly wise Approved Vendor List (AVL) is constructed with the relationship constraint to Vendor Dimension, as the AVL code changes according to Vendors tagged.

Cost Centre dimension has composite key, as a combination of Budget code and Budget year. This dimension is also a Slowly Changing Dimension of type two. As the current budget allocated is indicated by the current row indicator attribute set to current.

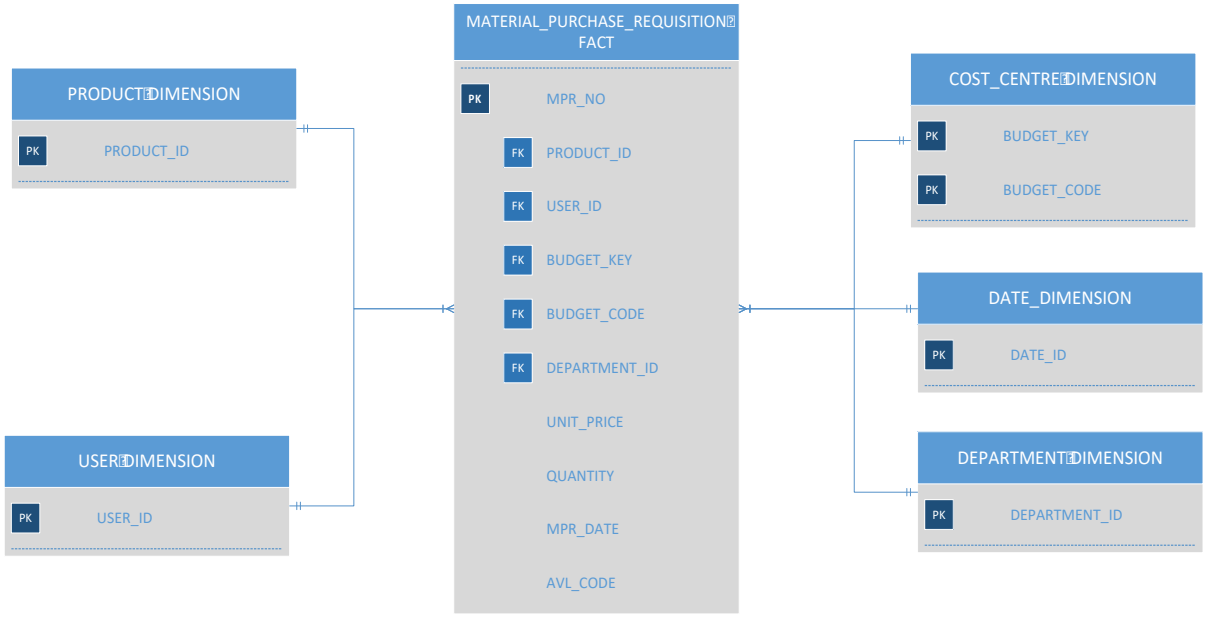


Enquiry Dimension is built to keep a track on stages of enquiry done before Purchase Order raised for e-Procurement and non e-Procurement process.

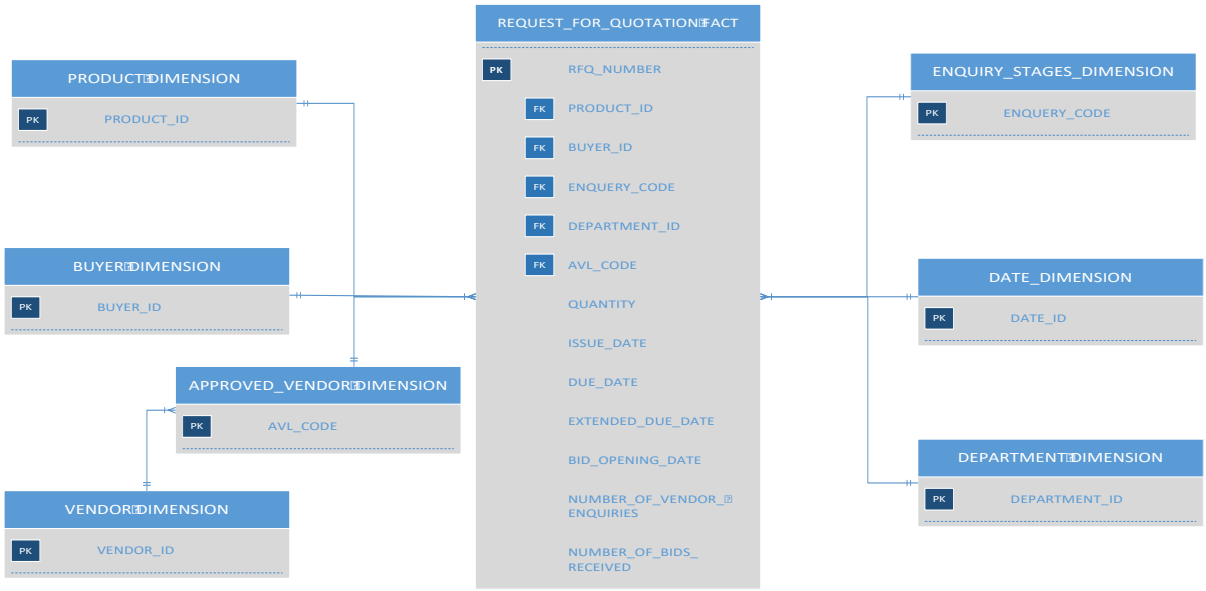
STAR SCHEMA HAVING FACT TABLES AND DIMENSION TABLES

As a part of Conceptual Schema identified the following Facts.

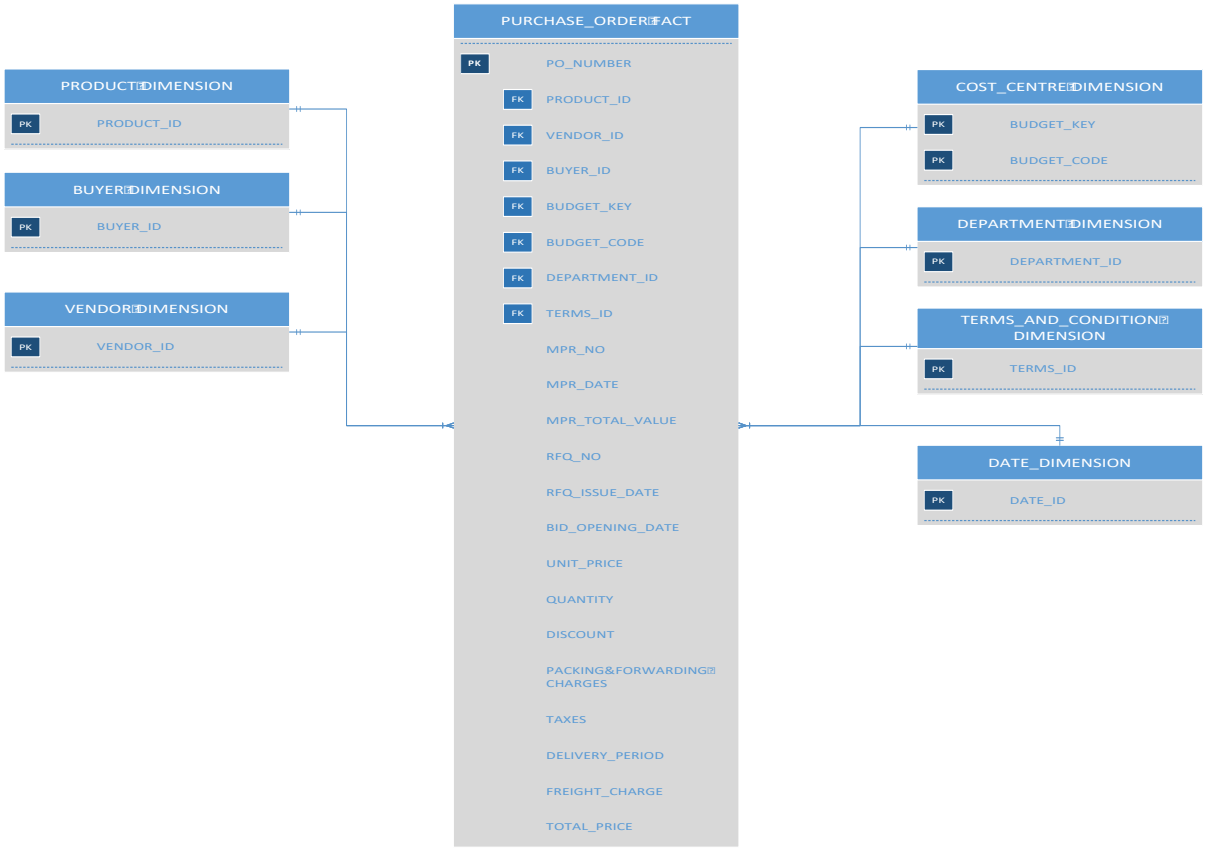
Process: Material Purchase Requisition (MPR): For the identified product user raises department wise request on the budget factor of that date.



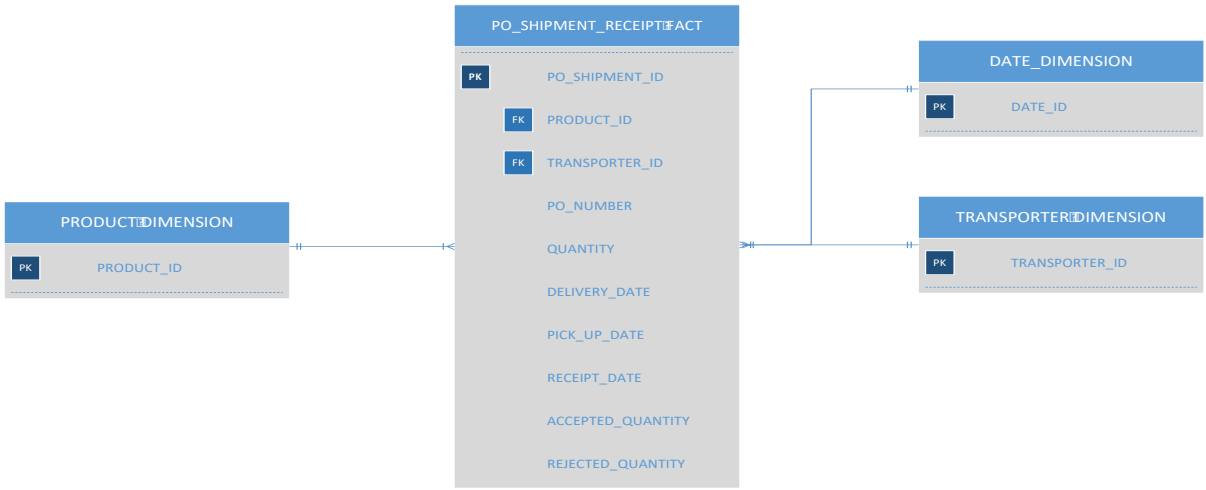
Process: Request for Quotation (RFQ): For the Product identified by user, buyer calls vendor bidding to the required quantity, track the received bids and number of vendors enquired with different stages



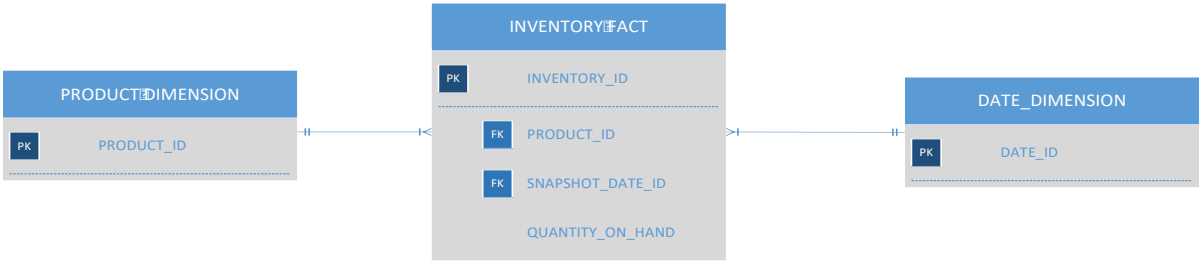
Process: Purchase Order (PO) : An important fact table in the procurement process. The PO has quantity procured for what price on what MPR ID and What RFQ ID. Has Terms & Conditions with vendor while making a deal . It's a **Transactional Fact Table. Derived Fact is Total Price = Quantity * Price**



Process: Purchase Order Shipment: Tracked the Product from procured date till the pick-up date and delivery date. Helps in analyzing the lead time in tern helps in making the procurement process quick. Which in term helps in cost saving to the company.
Derived Fact Rejected Quantity = Quantity – Accepted Quantity



Process: Inventory Management: The Procured Product after accepting and rejecting the quantity, added to the company's inventory data.
Inventory Snapshot is taken Monthly. So it's a **Snapshot Fact table**



FACT TABLE GLIMPSE

1) Inventory

Inventory ID	Product ID	Snapshot_Date_ID	Quantity On Hand
2521306	30007	8010	229220
2522798	30188	8020	146078
2522100	30059	8015	112859
2521856	30170	8013	89798
2522208	30148	8016	74829
2522636	30200	8019	71201
2521149	30077	8009	68445
2520821	30191	8007	65328
2520532	30172	8005	61310

2) Material Purchase Requisition (MPR)

MPR_NO	PRODUCT_ID	USER_ID	AVL_CODE	BUDGET_CODE	BUDGET_KEY	MPR_DATE	ESTIMATED_UNIT_PRICE	ESTIMATED_TOTAL_PRICE
252001140001	30018	1005788	1004	753-209-5689	2015	13-Nov-14	42.2376595	10770.60317
252001140002	30257	1005769	1190	437-356-4321	2015	16-Nov-14	66.08747304	22800.1782
252001140003	30017	1005789	1202	753-209-5689	2015	17-Nov-14	69.44143564	16596.50312
252001140004	30003	1007331	1008	753-209-5689	2015	19-Nov-14	35.94995356	9994.087089
252001140005	30073	1105753	1052	562-979-6390	2015	22-Nov-14	5.951659242	571.3592872
252001140006	30117	1007337	1252	562-979-6390	2015	22-Nov-14	14.71608386	1427.460135
252001140007	30113	1007337	1035	562-979-6390	2015	24-Nov-14	5.579309729	702.9930259
252001140008	30063	1105753	1148	072-625-8986	2015	24-Nov-14	4.355683778	492.192267
252001140009	30265	1005784	1193	380-494-6583	2015	25-Nov-14	130.1478968	221381.5724

3) Request For Quotation (RFQ)

RFQ_NO	PRODUCT_ID	BUYER_ID	DEPARTMENT_ID	AVL_CODE	ENQUIRY_CODE	QUANTITY	ISSUE_DATE	DUE_DATE	EXTENDED_DUE_DATE	BID_OPENING_DATE	NO_OF_VENDORS_ENQUIRY_ISSUED	NO_OF_BIDS_RECEIVED
252002140001	30018	100921	103	1004	1	255	12-Dec-14	26-Dec-14	NULL	26-Dec-14	5	2
252002140002	30257	110452	113	1190	1	345	15-Dec-14	29-Dec-14	NULL	29-Dec-14	3	3
252002140003	30017	109921	103	1202	3	239	05-Dec-14	19-Dec-14	NULL	19-Dec-14	3	2
252002140004	30003	100412	103	1008	1	278	19-Dec-14	02-Jan-15	NULL	02-Jan-15	3	3
252002140005	30073	100821	109	1052	3	96	12-Dec-14	26-Dec-14	05-Jan-15	05-Jan-15	3	2
252002140006	30117	103412	109	1252	1	97	15-Dec-14	29-Dec-14	NULL	29-Dec-14	3	1
252002140007	30113	100451	109	1035	1	126	10-Dec-14	24-Dec-14	NULL	24-Dec-14	3	1
252002140008	30063	102152	109	1148	1	113	10-Dec-14	24-Dec-14	NULL	24-Dec-14	3	3
252002140009	30265	103519	102	1193	2	1701	22-Dec-14	12-Jan-15	NULL	12-Jan-15	3	2
252002140010	30233	107435	111	1079	1	1	13-Dec-14	27-Dec-14	NULL	27-Dec-14	3	3

4) Purchase Order (PO)

PURCHASE_ORDER_NO	PRODUCT_ID	VENDOR_ID	BUYER_ID	BUDGET_CODE	BUDGET_KEY	DEPARTMENT_ID	T&C_ID	PO_DATE	MPR_NO	MPR_DATE	ESTIMATED_TOTAL_PRICE	RFQ_NO	RFQ	BID_OPENING_DATE	UNIT_PRICE	QUANTITY	DISCOUNT	DELIVERY_PERIOD	P&F_CHARGES	TAXES	FREIGHT_CHARGES	TOTAL_PRICE
252004140001	30018	8149075300	100921	753-209-5689	2015	103	5	03-Jan-15	252001140001	13-Nov-14	$10,770.60	252002140001	12-Dec-14	26-Dec-14	$48.00	255	1.00%	2	2.00%	7.00%	5.00%	$13,831.20
252004140002	30257	8149075301	110452	437-356-4321	2015	113	2	06-Jan-15	252001140002	16-Nov-14	$22,800.18	252002140002	15-Dec-14	29-Dec-14	$72.00	345	1.50%	2	2.00%	6.00%	0.00%	$26,454.60
252004140003	30017	8149075302	109921	753-209-5689	2015	103	5	02-Jan-15	252001140003	17-Nov-14	$16,596.50	252002140003	05-Dec-14	19-Dec-14	$48.00	239	3.00%	2	4.50%	7.50%	5.00%	$13,078.08
252004140004	30003	8149075303	100412	753-209-5689	2015	103	4	05-Jan-15	252001140004	19-Nov-14	$9,994.09	252002140004	19-Dec-14	02-Jan-15	$40.00	278	9.00%	6	2.50%	7.00%	3.00%	$11,509.20
252004140005	30073	8149075304	100821	562-979-6390	2015	109	10	10-Jan-15	252001140005	22-Nov-14	$571.36	252002140005	12-Dec-14	05-Jan-15	$5.00	96	7.50%	4	2.50%	8.50%	5.00%	$520.80
252004140006	30117	8149075305	103412	562-979-6390	2015	109	6	08-Jan-15	252001140006	22-Nov-14	$1,427.46	252002140006	15-Dec-14	29-Dec-14	$10.00	97	7.00%	2	5.00%	8.00%	6.50%	$1,091.25
252004140007	30113	8149075306	100451	562-979-6390	2015	109	5	07-Jan-15	252001140007	24-Nov-14	$702.99	252002140007	10-Dec-14	24-Dec-14	$4.00	126	8.50%	3	4.00%	7.50%	5.00%	$544.32
252004140008	30063	8149075307	102152	072-625-8986	2015	109	8	02-Jan-15	252001140008	24-Nov-14	$492.19	252002140008	10-Dec-14	24-Dec-14	$3.00	113	0.50%	3	0.50%	7.00%	0.00%	$362.73
252004140009	30265	8149075308	103519	380-494-6583	2015	102	2	21-Jan-15	252001140009	25-Nov-14	$2,21,381.57	252002140009	22-Dec-14	12-Jan-15	$125.00	1701	4.00%	3	3.00%	8.50%	0.00%	$2,28,571.88
252004140010	30233	8149075309	107435	200-400-1234	2015	111	5	09-Jan-15	252001140010	25-Nov-14	$48,552.93	252002140010	13-Dec-14	27-Dec-14	$32,711.00	1	10.00%	6	2.50%	7.50%	3.00%	$33,692.33
252004140011	30056	8149075310	100921	072-625-8986	2015	109	11	17-Jan-15	252001140011	26-Nov-14	$697.03	252002140011	18-Dec-14	01-Jan-15	$5.00	100	0.50%	5	0.50%	7.00%	5.00%	$560.00
252004140012	30126	8149075311	110452	072-625-8986	2015	109	1	08-Jan-15	252001140012	26-Nov-14	$1,216.28	252002140012	15-Dec-14	29-Dec-14	$9.00	130	0.50%	7	2.50%	7.00%	0.00%	$1,275.30
252004140013	30270	8149075312	109921	380-494-6583	2015	102	11	08-Jan-15	252001140013	27-Nov-14	$3,43,743.70	252002140013	17-Dec-14	31-Dec-14	$131.00	1766	8.00%	3	2.00%	7.00%	5.00%	$2,45,226.76
252004140014	30244	8149075313	100412	072-625-8986	2015	107	3	02-Jan-15	252001140014	28-Nov-14	$4,143.51	252002140014	10-Dec-14	24-Dec-14	$64.00	44	2.00%	1	2.00%	5.00%	0.00%	$2,956.80

5) Purchase Order Shipment

PO_SHIPMENT_ID	PRODUCT_ID	TRANSPORTER_ID	QUANTITY	DELIVERY_DATE	PICK_UP_DATE	RECEIPT_DATE	ACCEPTED_QUANTITY	REJECTED_QUANTITY	PURCHASE_ORDER_NO
637860	30250	83615	255	07-Mar-15	19-Mar-15	21-Mar-15	225	30	252004140001
637861	30153	83615	345	03-Mar-15	22-Mar-15	26-Mar-15	325	20	252004140002
637862	30124	NA	239	04-Jul-15	04-Jul-15	7-Jul-15	194	45	252004140003
637863	30037	83615	278	10-May-15	01-May-15	7-May-15	244	34	252004140004
637864	30178	83615	96	09-Mar-15	04-Apr-15	7-Apr-15	73	23	252004140005
637865	30026	83615	97	07-Apr-15	10-Apr-15	12-Apr-15	85	12	252004140006
637866	30109	83615	126	02-Apr-15	12-Apr-15	14-Apr-15	104	22	252004140007
637867	30095	83615	113	21-Apr-15	04-May-15	9-May-15	69	44	252004140008
637868	30163	NA	1701	08-Jul-15	08-Jul-15	13-Jul-15	1668	33	252004140009

Connecting the front end visualization tool Tableau:

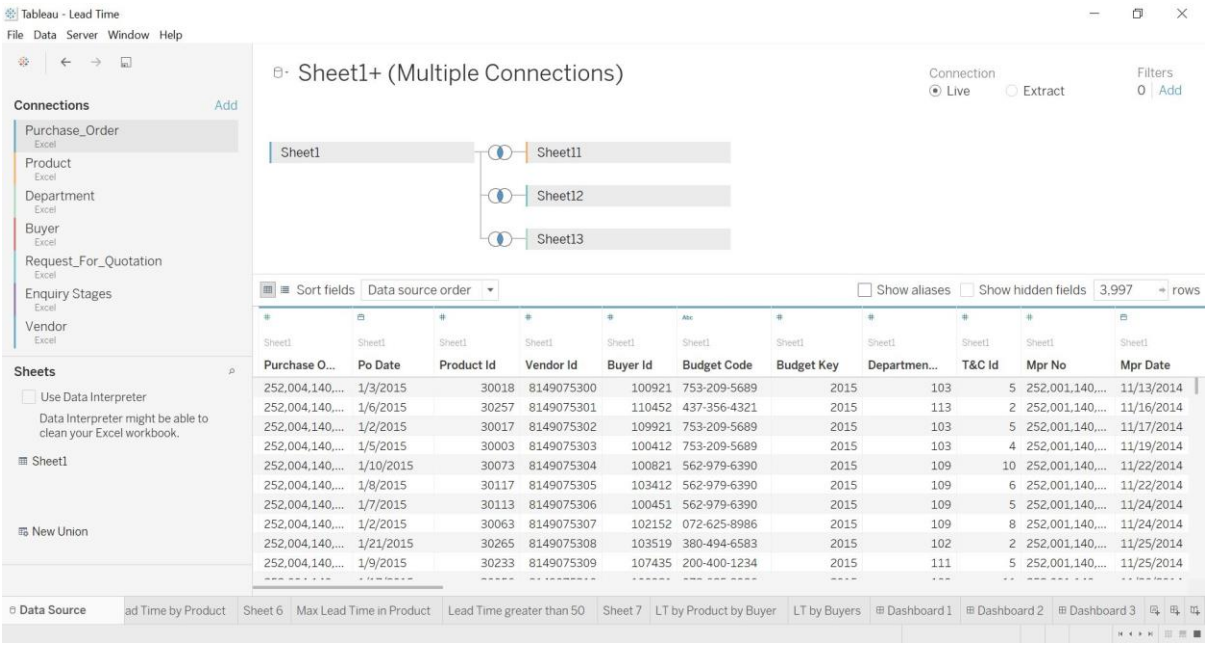
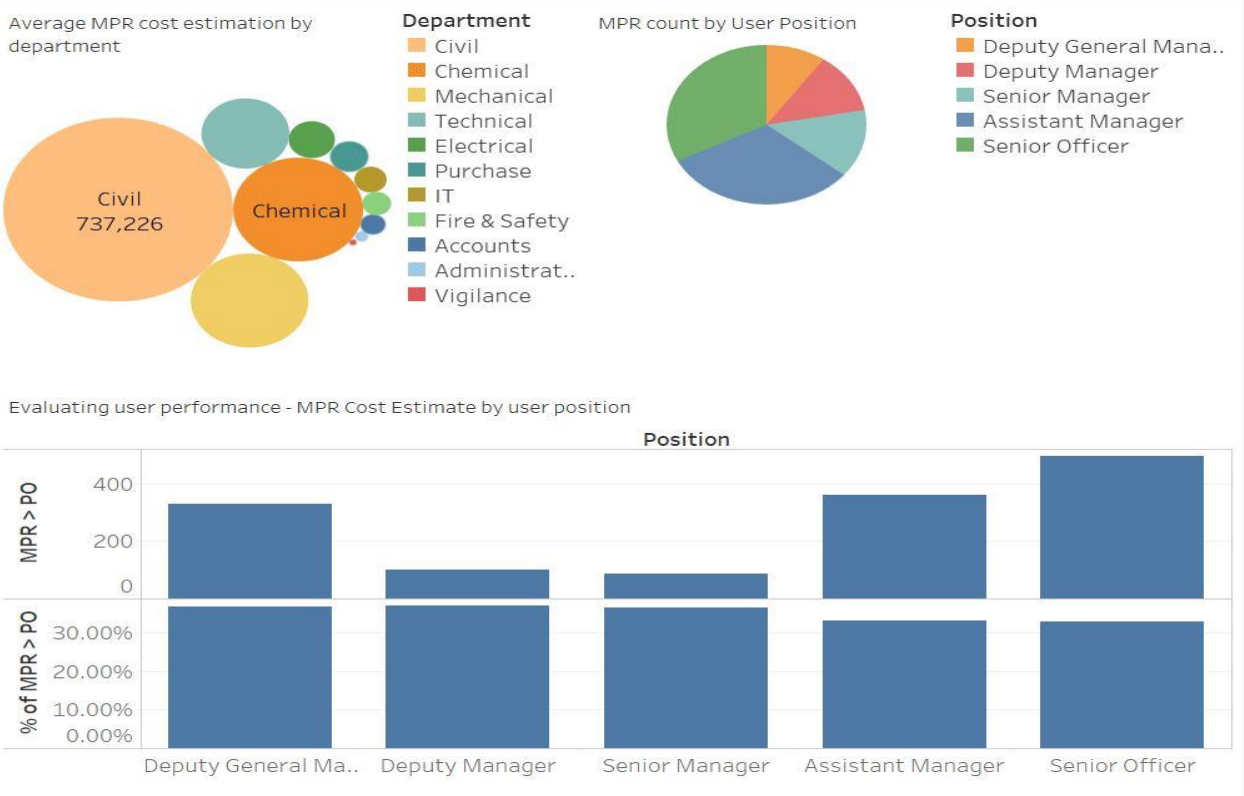


Tableau established a connection between Fact Table and Dimension Tables

DASHBOARDS:

MPR Cost Estimation by user position

Cost Estimate is an important KPI. In the Business Process, user creates an MPR which consists of Total Cost Estimation of the MPR. Hence, user should be able to estimate properly. Below dashboard helps in analyzing user performance based on user position in the organization. Accordingly, proper recommendation is provided.

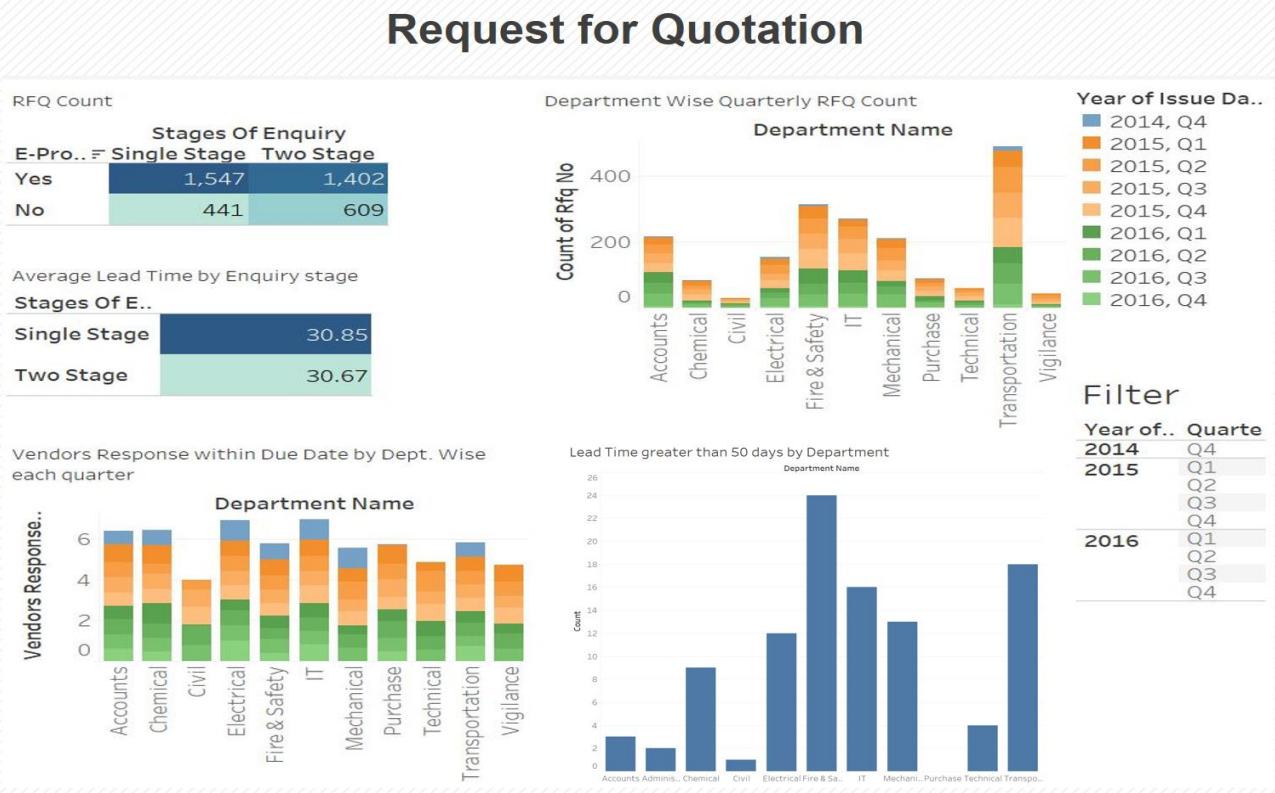


Average MPR cost estimation by department shows that for Civil department each MPR has an average cost estimation value of $737,226/-. Next in the order are Chemical, Mechanical, Technical etc. Since Civil is having high cost estimate, assigning the work of raising MPR's of Civil Department to users who are in higher position like Deputy General Manager or Deputy Manager may be appropriate. However, to conclude that, we have to make sure that users at higher position are performing well in estimating the cost. Drilling down to MPR count by user position shows that Senior Officers and Assistant Manager position users are raising more number of MPR's. From the histogram graph, count of number of MPR's cost estimate greater than PO value is higher for Senior Officer which is around 450. If we drill down further to see the percentage of number of MPR's cost estimate greater than PO value by each user position, everyone is estimating 1/3rd of their MPR's value greater than PO value. Hence, irrespective of user position everyone is estimating poorly. Proper training is to be given to all the users on how to estimate the cost while raising an MPR.

From above dashboard, following questions can be answered

1. What is the average cost estimation by department per MPR?
2. Number of MPR's each user with a specific position has issued?
3. What is the user performance in cost estimation?
4. How many orders have lower PO value as compared to MPR value?

Request for Quotation Analysis



From the above dashboard, we know that total RFQ's issued through eProcurement is more than RFQ's issued without eProcurement which is good. Also RFQ's issued in single stage and two stage is almost same. However if we see the average Lead Time by enquiry stage, for both single stage and two stage it is around 31 days. In two stage enquiries, all the vendors are eligible to submit Add-On price/ Take-Off price if any before the opening of price bid where as in single stage only the vendor who quoted lowest value is eligible to submit revised price. Hence from companies perspective, two stage enquiry has more advantage than single stage enquiries. Since Lead Time is almost same for both single stage and two stage enquiries, effor should be made to issue more number of RFQ's in two stage.

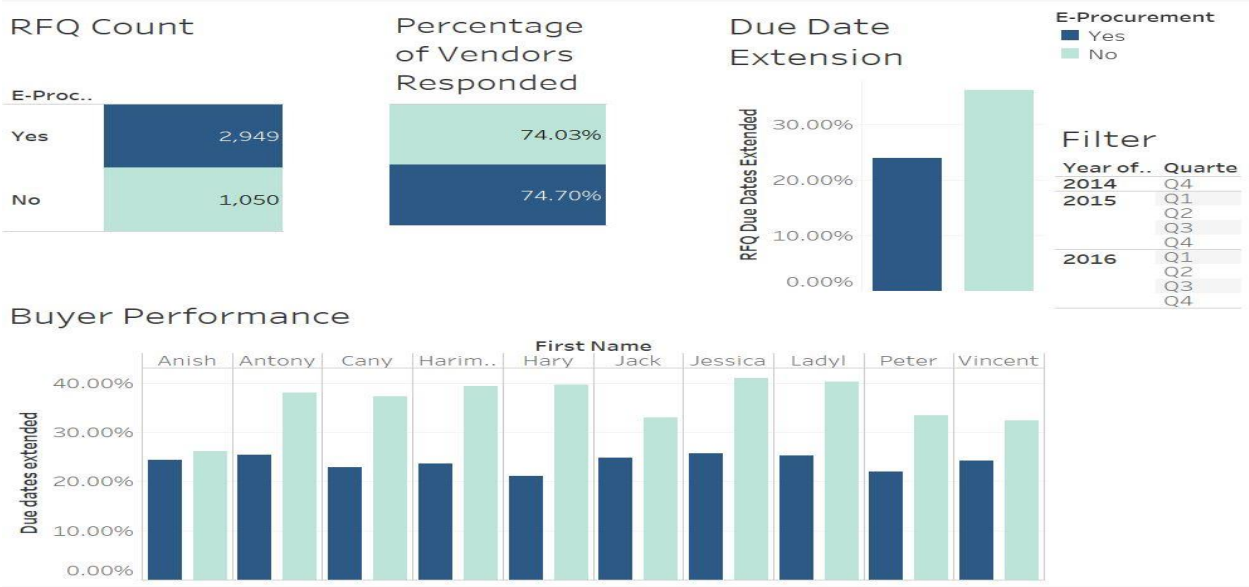
From Department wise RFQ count, we see that Transportation department has highest number of RFQ's issued. Also vendor's response within first due date is poor for Civil department. This increases the Lead Time. Hence, vendors under Civil department category are to be reviewed and they may be notified to submit their bids within 1st Due Date. Even Transportation department has not so good vendors response because of which Lead Time more than 50 days is 18 times for Transportation department. However, the highest is for Fire & Safety department which is 24 times where Lead Time is greater than 50 days. With the filter option provided, quarterly and yearly analysis can also be done.

From above dashboard, following questions can be answered

1. No of single stage RFQ's and two stage RFQ's issued and the Lead Time for RFQ's with single stage and two stage?
2. What is the RFQ count by quarter by department?
3. What is the vendors' response within Due Date by quarter by department?

eProcurement Analysis:

By making procurement through eProcurement, Lead Time can be reduced considerably. Hence, it becomes an important KPI. Following dash board can be used to analyze eProcurement performance.

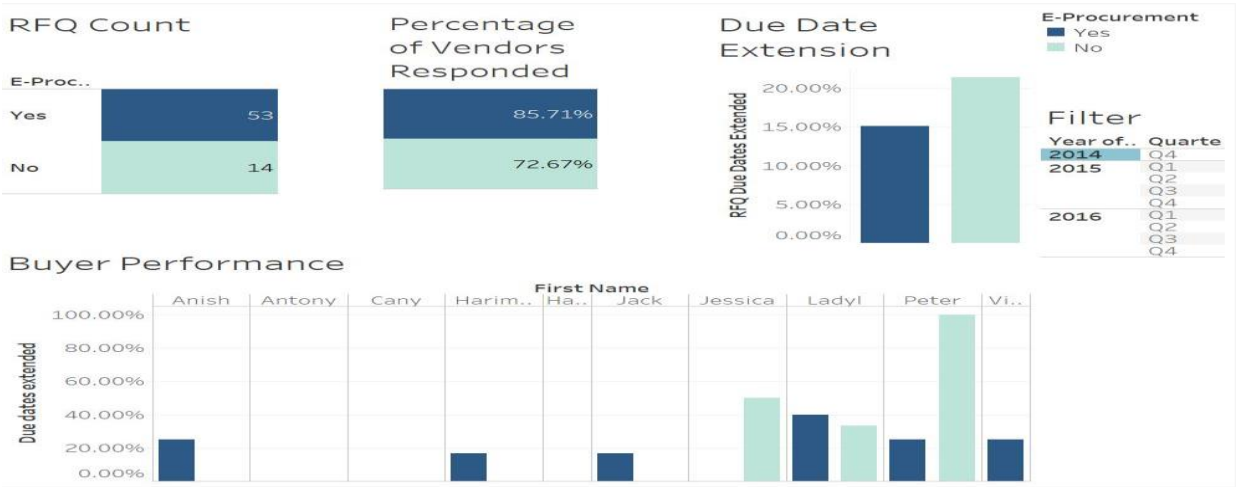


Vendors response in terms of number of vendors responded to an RFQ is slightly good in eProcurement case. Also vendor's response within 1st Due Date is very good in eProcurement which is around 24% compared to 38% from non-eProcurement cases.

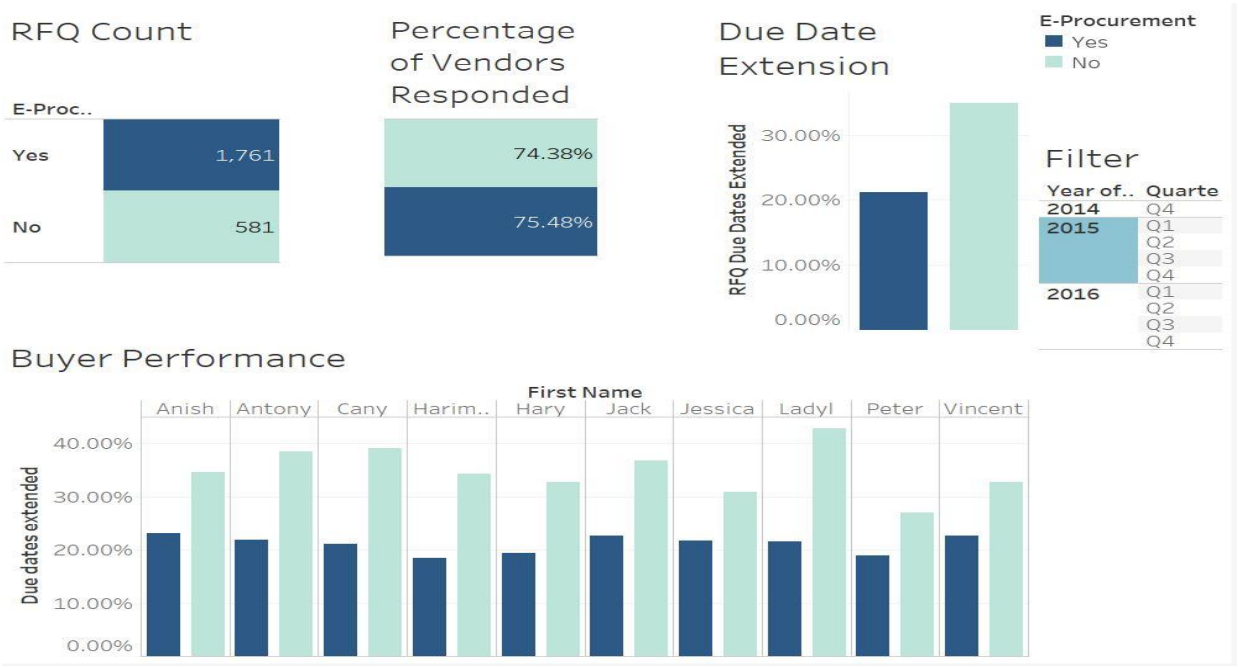
It is the responsibility of Buyer to expedite the purchase process with less Lead Time. If a vendor is not responding within 1st Due Date, Buyer has to contact respective vendors to ask them to submit quotations. If we analyze Buyer's performance based on vendors' response within 1st Due Date for eProcurement cases, almost everyone has around 25% of their RFQ due dates extended. In case of non-eProcurement cases, except Anish everyone else has around 35% – 40% of their RFQ due dates extended. Hence, Buyers should make efforts to convert more and more RFQ's towards eProcurement.

Following three dashboards shows the year wise/ quarter wise analysis of the same.

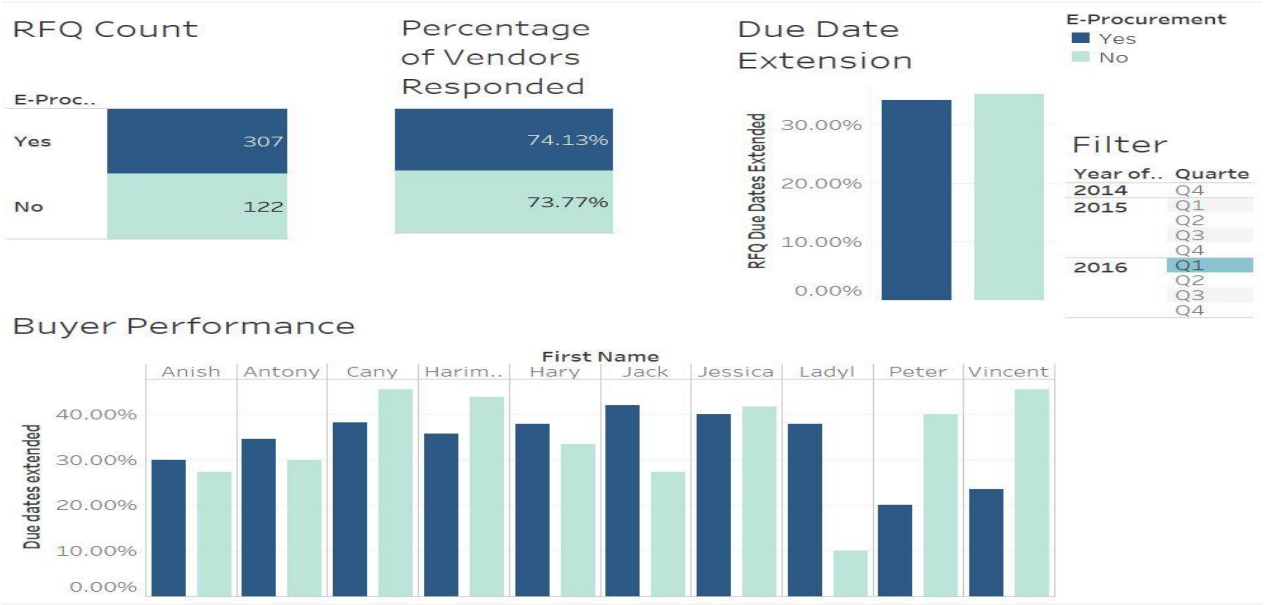
<u>Year 2014</u>



Year 2015:



Year 2016 Quarter Q1:

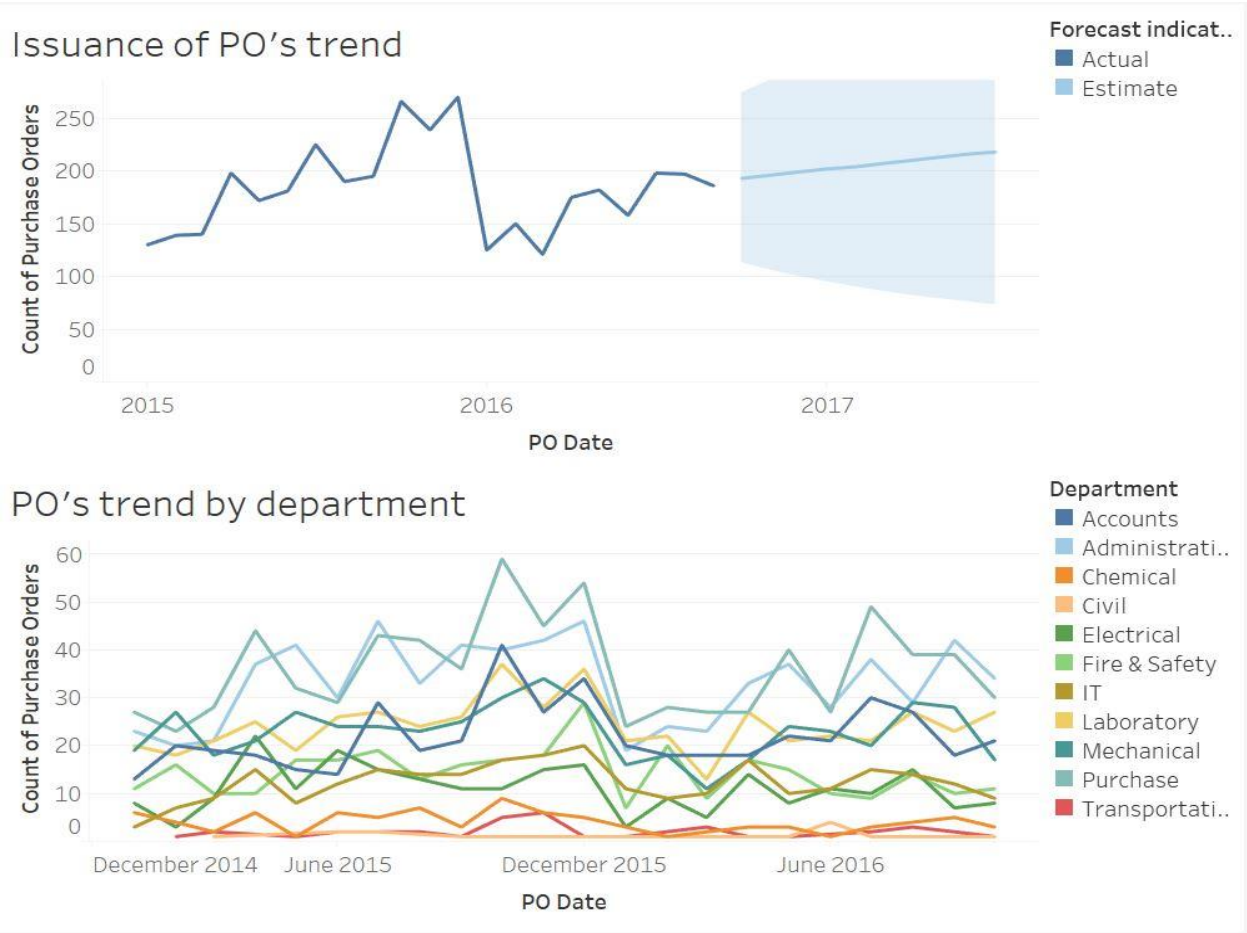


From above dashboards, following questions can be answered

1. Percentage of vendors who are responding through eProcurement and without eProcurement?
2. How many quotations we are receiving within 1st due date?
3. How many RFQ's are being issued through eProcurement?
4. How many RFQ's were opened within 1st due date?
5. What is the percentage of RFQ due date's extended with and without eProcurement?
6. How is the Buyer's performance in terms of RFQ due date's extended with and without eProcurement?

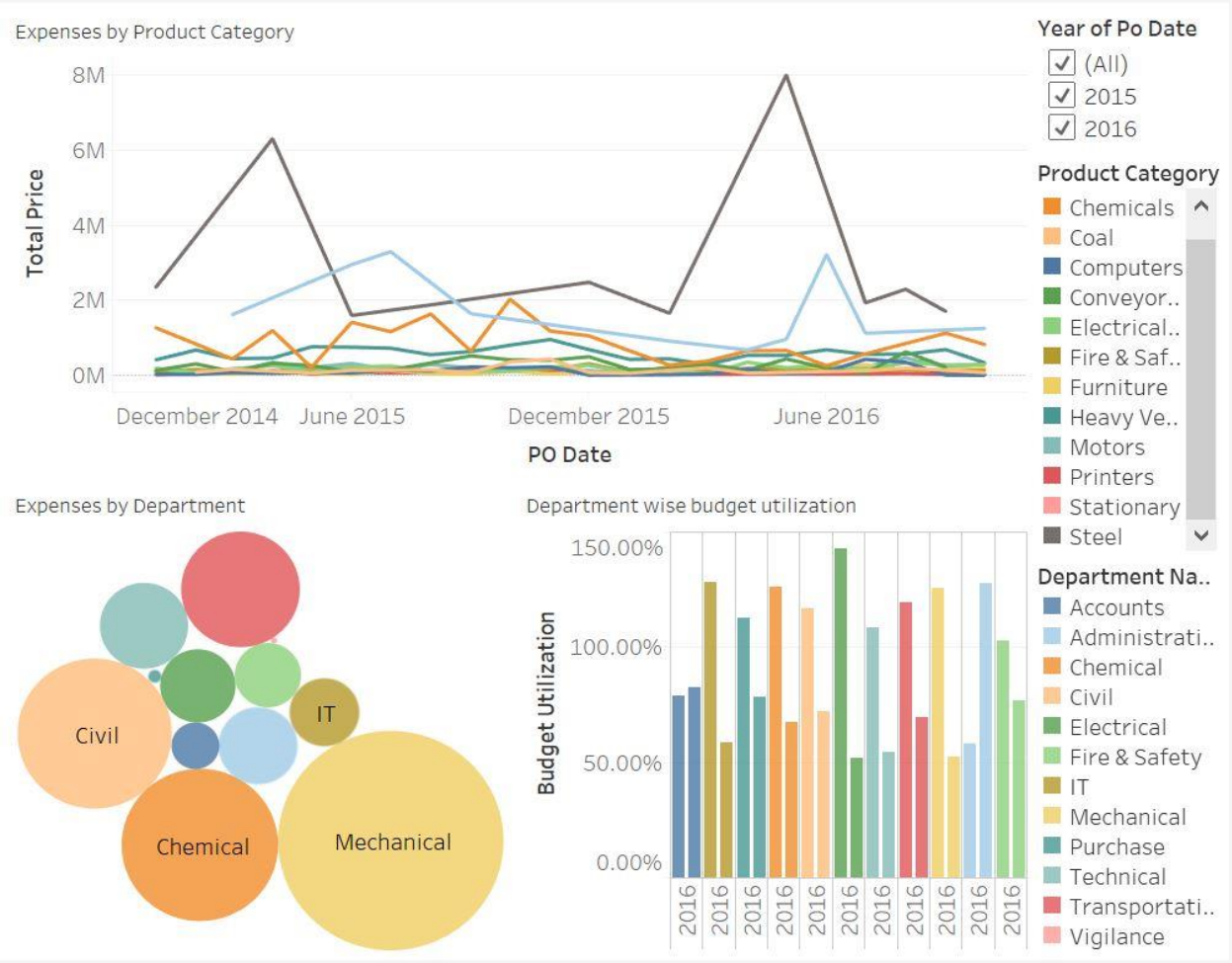
Purchase Orders Analysis

A financial year is from Jan to Dec. Hence, from the below graph it is evident that the number of Purchase Orders is increasing during Q4 as during an end of a financial year vendors try to provide more discount to increase their financial sales figure which increases the number of Purchase Orders. Again there is a considerable decrease in Purchase Orders count in Q1 2016 compared to Q4 2015 as more number of purchases are already made in Q4 2015. Also Purchase Orders forecast is made with 95% confidence interval which shows a slight increase in Purchase Orders count from Q4 2016 t Q1 2017.



From department wise PO issuance trend, Fire & Safety has more number of PO's issued. Also almost all the departments are utilizing the proper discount in Q4 by increasing their Purchase Orders in this period.

If we see PO value by product category, Steel comes first and Motors come second. Also Steel is being procured in bulk quantity during April, May period every year for some reason.



If we see PO value by department, Mechanical department has highest total PO value (Expense). Since, Steel comes under Mechanical department this is justified. Civil and Chemical departments are next to Mechanical Departments. Considering that this is a Fertilizer Manufacturing Industry, it makes sense that these departments contains the major share.

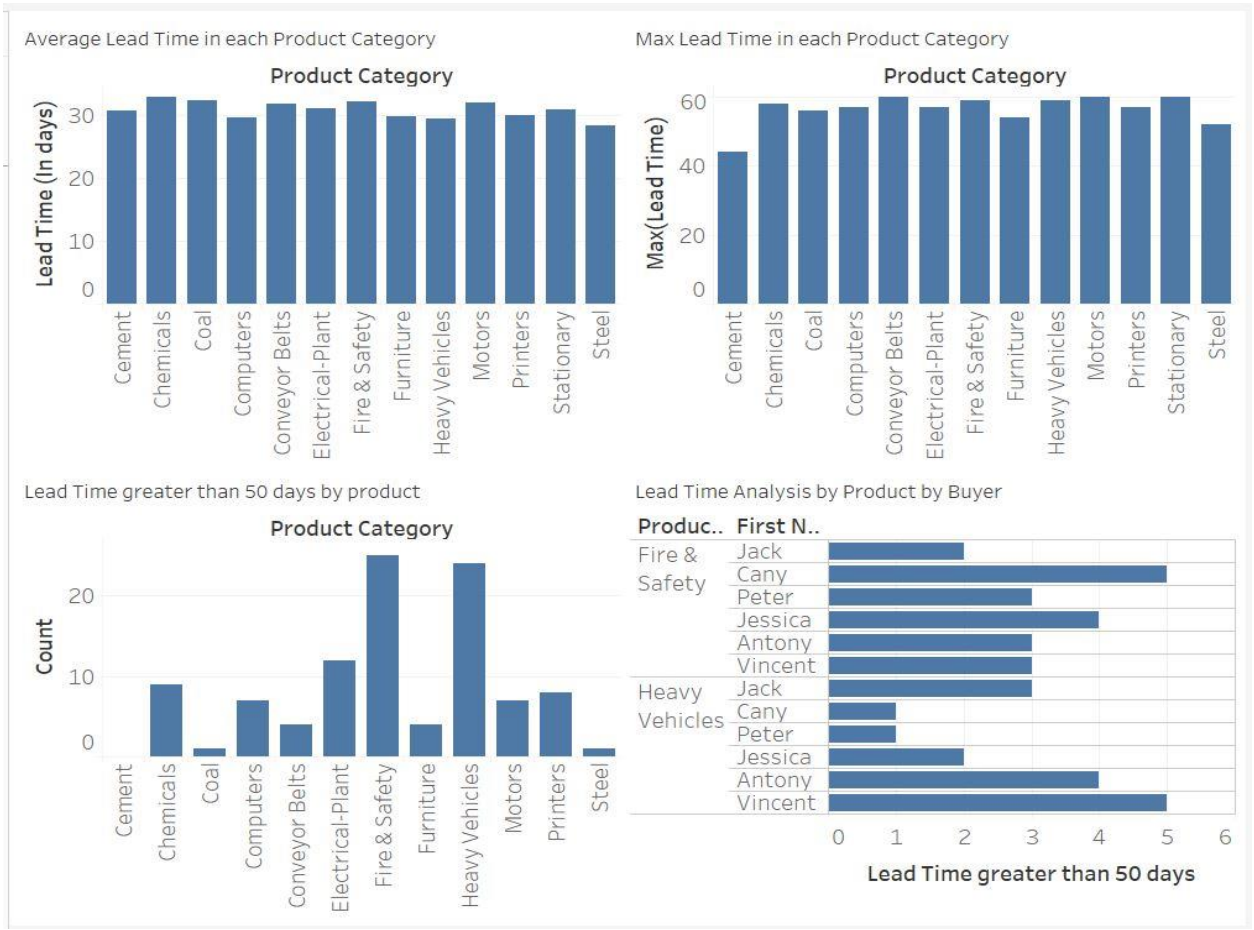
A fixed budget is allocated to every department for a financial year. If we analyze their Budget Utilization, Electrical department is utilizing around 150% of the budget allocated in year 2015. This means that budget may not have allocated appropriately for Electrical department or Electrical department might have over utilized. By analyzing the same, budget allocation can be made properly for all the departments. Also Administration department has Under Utilized in 2015 and Over Utilized in 2016.

From above dashboards, following questions can be answered

1. Issuance of PO's trend by product category and forecast for next 4 months?
2. Total value of orders by product category for each financial year?
3. Total value of orders by department category?
4. What is the department wise budget utilization?

Lead Time

Lead Time is an important KPI in procurement. With less Lead Time, procurement process can be made fast which in turn increases the overall productivity of the company. Following dashboard helps in analyzing the same.



Lead Time by product category shows that almost all the products are having similar Lead Time which is around 30 days. However, if we see maximum Lead Time in each product category except in Cement category all other categories are having maximum Lead Time of around 60 days. If we drill down further, count of Lead Time greater than 50 days is more for Fire & Safety and Heavy Vehicles categories. Hence, drill down to Buyers who are looking after these two product categories and ask them to take proper action to decrease the Lead Time.

From above dashboard, following questions can be answered

1. Count of PO's where Lead time is greater than 50 days by department?
2. What is the average lead time in each product category?
3. What is the maximum lead time in each product category?
4. Lead Time analysis by product category by buyer?

Vendor Review Management:

Vendor's are to be reviewed on timely basis based on many factors. By filtering vendors who are not performing upto a predefined criterion, procurement goals can be achieved. Following dash boards helps in choosing the right vendors.

Top 10 vendors by Procurement Value

Vendor Name	
OREGON STEEL ..	$2,578,782
BAOSTEEL	$2,570,001
TECHLINE STEEL ..	$2,535,890
ALLEGHENY TEC..	$2,417,177
DEMCO INC	$2,270,407
HULL SUPPLY CO ..	$2,221,596
MILLER UNIFOR..	$1,748,973
W W GRAINGER I..	$435,495
TECHLINE INC	$387,280
PRIESTER-MELL ..	$367,855

Vendors Rank by discount amount provided till date

Vendor Name	
OREGON STEE..	$215,902
ALLEGHENY TE..	$178,159
HULL SUPPLY C..	$177,309
NUCOR	$168,709
POHANG IRON ..	$161,409
ROCKY BRAND..	$160,362
OLDCASTLE AP..	$152,312
FERGUSON EN..	$142,025
MILLER UNIFO..	$86,171
TECHLINE INC	$25,289

Vendors Count by Product Category

Product Categ..
- Cement
- Steel
- Coal
- Conveyor ..
- Chemicals
- Motors
- Computers
- Printers
- Electrical-..
- Furniture
- Fire & Safe..
- Heavy Veh..

Top vendors by rejected quantity

Vendor Name	Received Order Lines		Rejected Order Lines		Rejection Ratio	
	2015	2016	2015	2016	2015	2016
LAIRD PLASTICS I..	4.00	4.00	2.00	2.00	0.50	0.50
BOHLS EQUIPME..	5.00	4.00	2.00	2.00	0.40	0.50
ACE 1 POWER EQ..	4.00	4.00	0.00	2.00	0.00	0.50
Brazos Technolo..	3.00	6.00	1.00	1.00	0.33	0.17
AUSTIN OUTDOO..	3.00	5.00	0.00	1.00	0.00	0.20
FURNITURE MAR..	4.00	4.00	0.00	1.00	0.00	0.25
JFE HOLDINGS	3.00	5.00	1.00	0.00	0.33	0.00
MCKESSON MEDI..	13.00	23.00	2.00	2.00	0.15	0.09
NOVAMED USA, I..	4.00	5.00	1.00	0.00	0.25	0.00
SAFETY SHOE DI..	3.00	6.00	1.00	0.00	0.33	0.00

From the top 10 vendors by PO value, we observe that vendors who supply steel are in more number in this list. If we see vendors rank by discount amount provided till date, most of the vendors who are in top 10 by PO value are in this list as well. So they may be retained.

In our Approved Vendor List, each AVL category consists of a list of vendors to whom RFQ's are to be issued. If more number of vendors are there, more competitive prices can be obtained. Hence, from vendors count by product category we see that most number of vendors exist for Heavy Vehicles. Cement has the least number of vendors. However, Cement being a regular product that is needed action should be taken to add new vendors in this list to avoid any monopoly by few vendors who are already in the Cement Category.

From Top vendors by rejected by quantity, we observe that M/s LAIRD PLASTICS INC has 50% rejection ratio. Hence, this company has to be kept under Blacklist or should be de-registered from the Approved Vendor List. After reviewing, similar action should be taken for remaining vendors as well.

Vendors who supply the material on time is an important criterion while evaluating vendors' performance. Following dashboard helps in evaluating the same.

Early delivery

Vendor Name	
TECHLINE INC	98
W W GRAINGER INC	64
PRIESTER-MELL & NICHOLSON ..	55
MILLER UNIFORMS & EMBLEM..	45
KBS ELECTRICAL DISTRIBUTOR..	34
APAC-TEXAS INC	27
DELL MARKETING LP	22
POWER SUPPLY INC	22
QUADMED INC	21
HAVERDA ENTERPRISES INC	19

Late Delivery

Vendor Name	
TECHLINE INC	112
W W GRAINGER INC	73
MILLER UNIFORMS & EMBLEMS INC	59
PRIESTER-MELL & NICHOLSON INC	50
HAVERDA ENTERPRISES INC	39
APAC-TEXAS INC	35
KBS ELECTRICAL DISTRIBUTORS INC	34
POWER SUPPLY INC	34
DELL MARKETING LP	25
SID TOOL CO INC	25

Early Delivery Ratio Analysis

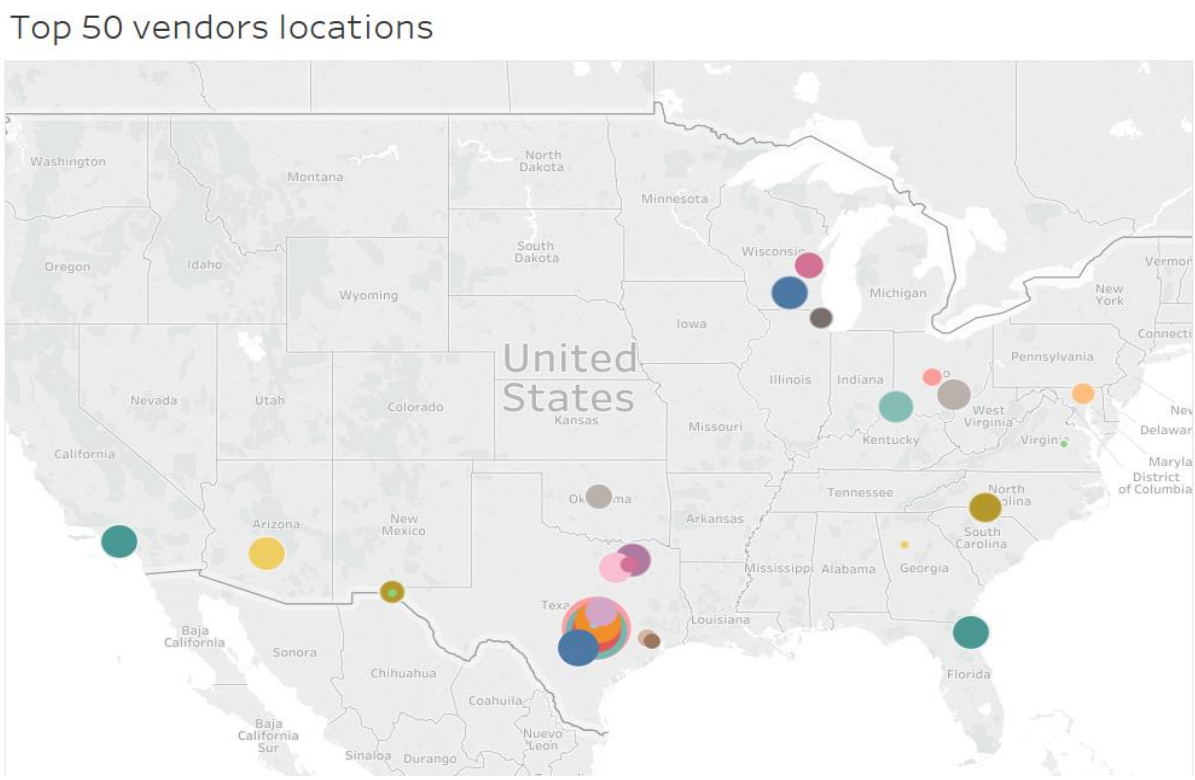
Vendor Name	
BRUNSWICK COMMERCIAL & G..	0.70
4 IMPRINT INC	0.67
DEMCO INC	0.60
HK FASTENER & SUPPLY INC	0.60
BAYSCAN TECHNOLOGIES	0.50
Cliff Logan	0.50
TASCO AUTO COLOR	0.50
TRAFFIC PARTS INC	0.50
QUADMED INC	0.42
COTHRON'S SAFE & LOCK INC	0.40

Late Delivery Ratio Analysis

Vendor Name	
ALLEGHENY TECHNOLOGIES	0.60
BOHLS EQUIPMENT CO/BOHLS BE..	0.60
Brazos Technology Corporation	0.60
Guardian Industrial Supply, LLC	0.60
LUDECA INC	0.60
NOVAMED USA, INC.	0.60
QUICKIE WASH	0.60
TITUS SYSTEMS LP	0.60
WEST MARINE	0.60
CHECKPOINT SERVICES INC	0.55

From Top 10 vendors who has made early supply, we see that M/s TECHLINE INC has made 98 of their deliveries before the delivery period. However, if observe top 10 vendors who has made late delivery, same vendor M/s TECHLINE INC has topped the list with 112 late deliveries. Hence, in terms of count M/s TECHLINE INC has topped in both the lists. This may be because more number of orders are being issued to this vendor. If we see ratio analysis, M/s TECHLINE INC is not there in either early delivery or late delivery. M/s BRUNSWICK COMMERCIAL has made 70% of their deliveries early and M/s ALLEGHENY TECHNOLOGIES has made 60% of their deliveries late. Hence, ratio analysis should be preferred over count analysis but even the count analysis shouldn't be ignored as 112 late deliveries by M/s TECHLINE INC can't be neglected.

From the below Top 50 vendors' locations we observe that most of our vendors are from Texas, East and North region of USA.

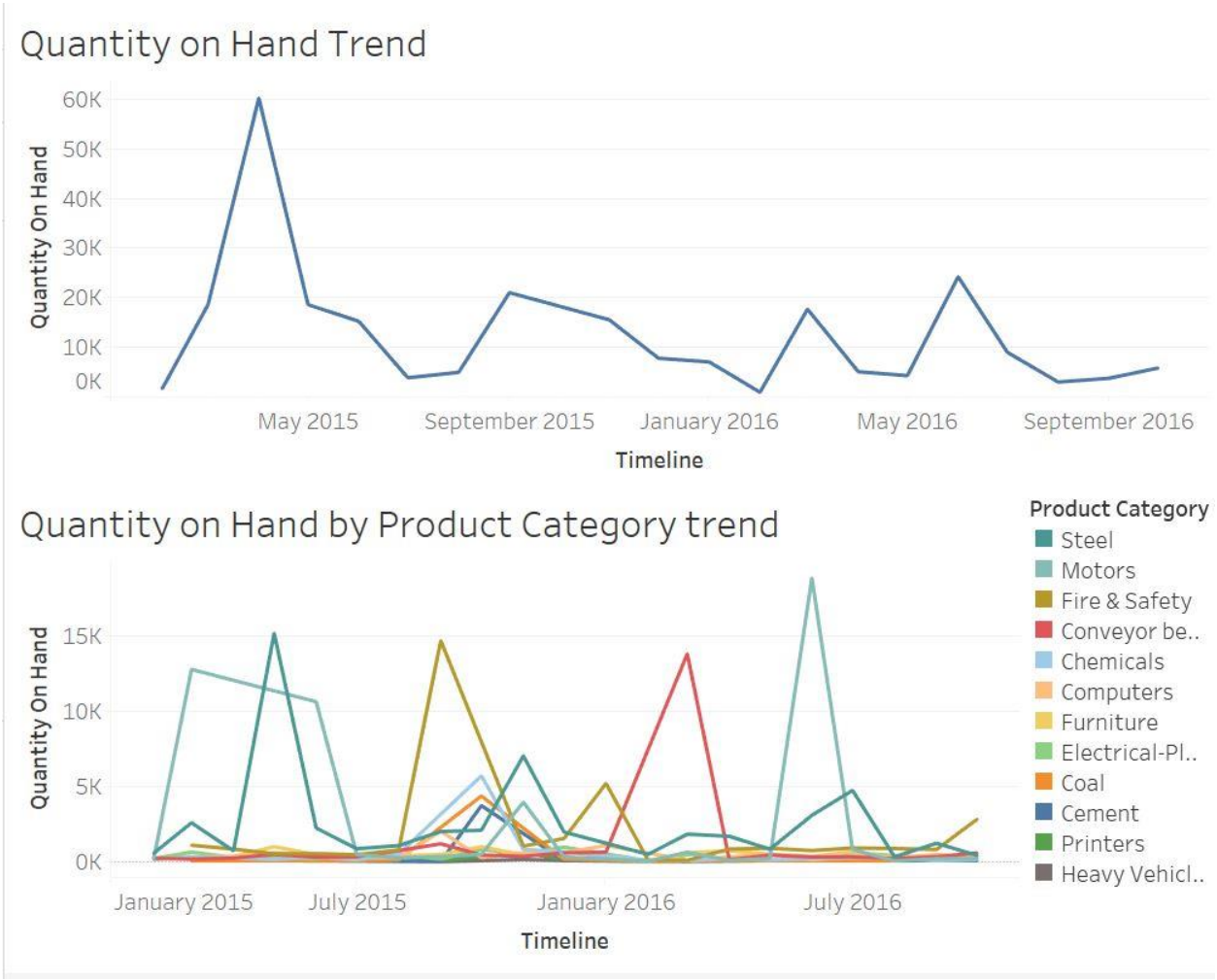


From above dashboards, following questions can be answered

1. How do vendors rank by volume by item and revenue spent for last one year?
2. Total discount provided by all the vendors by month?
3. Vendors who are not supplying within delivery time?
4. Vendors who has not provided quality items?
5. Vendors who has provided maximum amount of discount?
6. What is the vendors count by product category?
7. What is the region of top 50 vendors in terms of procurement value?

Quantity on Hand:

While maintaining a required number of inventory is idle, having high quantity or low quantity than the required quantity is a huge liability to the company. Hence, QOH is an important KPI to analyze. Following dashboard helps in analyzing the trend of QOH.



During March, QOH value is increasing because from PO analysis we have seen that number of PO's are more in Q4 period which is Oct-Dec which means that items against those PO's are being delivered during Feb and March period. But if we drill down to Product wise analysis, we can observe that because of Steel and Motors there is a huge raise in overall QOH during March period. Also for most of the products such as Computers, Electrical etc. the graph is almost flat which tells that their QOH is maintaining consistency without Stock Outs or Over Quantity.

From above dashboard, following questions can be answered

1. What is the Quantity on Hand trend by product category?
2. What is the Quantity on Hand trend over period?

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