

# **SEMESTER 6 – PROFESSIONAL ELECTIVE COURSE**

**Project Title : Financial Expense Optimization**

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## **EDA Using Power BI**

### **Project Title: Financial Expense Optimization**

#### **Problem Statement**

A mid-size enterprise tracks expenses across departments such as HR, IT, Finance, and Operations. Despite stable revenue, operational costs are rising, causing profit margins to shrink.

Finance leadership wants better visibility into:

- Department-wise expense distribution
- Monthly spending patterns
- Expense categories contributing to overspending

Your role is to prepare a financial monitoring dashboard that helps management:

- Control unnecessary expenses
- Detect cost overruns early
- Support budgeting decisions

#### **Questions:**

- Identify missing or inconsistent expense data.
- Which departments incur the highest total expenses?
- Analyze expense distribution across expense types.
- How do monthly expenses trend over time?
- Create DAX measures for Total Expenses and Monthly Average Expense.
- Compare actual expenses against budget using visuals.
- Identify departments exceeding budget limits.
- Design a financial monitoring dashboard.
- What cost-control actions can be recommended?

## Identify missing or inconsistent expense data.

The screenshot shows the Power BI Data Profiler interface with the following details:

- Query Settings:** Monospaced, Column distribution, Always allow, Show whitespace, Column profile, Column quality.
- Layout:** Data Preview, Parameters, Go to Column, Advanced Editor, Query Dependencies.
- Queries [1]:** Expenses - Table.TransformColumnTypes
- Data Preview:** Shows a table with columns: Date, Month, Department, Expense Category, Expense Amount, and Budget Amount. Each column has a corresponding histogram showing the distribution of values (Valid, Error, Empty).
- Column statistics:**

|          | Count | Min        | Max        | Average    |
|----------|-------|------------|------------|------------|
| Count    | 48    | 01-01-2025 | 01-12-2025 | 16-06-2... |
| Error    | 0     |            |            |            |
| Empty    | 0     |            |            |            |
| Distinct | 12    |            |            |            |
| Unique   | 0     |            |            |            |
- Value distribution:** A histogram showing the distribution of dates from 01-01-2025 to 01-12-2025.
- Properties:** Name: Expenses, All Properties.
- Applied Steps:** Source, Navigation, Promoted Headers, Changed Type.

- No missing or inconsistent expense data was found in the dataset.

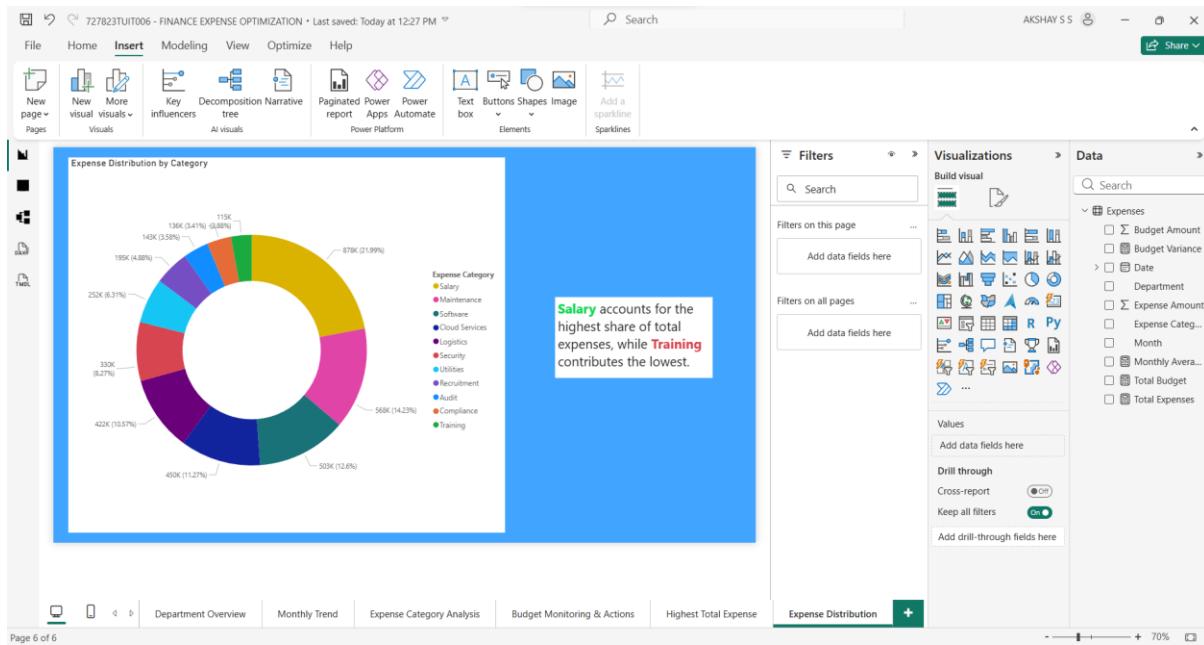
## Which departments incur the highest total expenses?

The screenshot shows the Power BI Analysis view with the following details:

- File, Home, Insert, Modeling, View, Optimize, Help:** Standard ribbon menu.
- Insert:** Visuals, Key influencers, Decomposition tree, Power report, Power Platform, Elements, Add a sparkline, Sparklines.
- Visualizations:** Bar chart titled "Total Expenses by Department". The Y-axis is "Sum of Expense Amount" ranging from 0.0M to 1.2M. The X-axis is "Department" with categories IT, HR, Operations, and Finance. The bars show values of approximately 1.28M, 1.19M, 0.99M, and 0.53M respectively. A callout box highlights that IT incurs the highest total expenses.
- Filters:** Search, Filters on this page, Filters on all pages.
- Visualizations:** Build visual, Filter, Sort, Refresh, Refresh All, Refresh Now, Refresh Later, Refresh Off.
- Data:** Search, Expenses, Budget Amount, Budget Variance, Date, Department, Expense Amount, Month, Monthly Average, Total Budget, Total Expenses.
- Values:** Add data fields here.
- Drill through:** Cross-report (Off), Keep all filters, Add drill-through fields here.
- Page navigation:** Department Overview, Monthly Trend, Expense Category Analysis, Budget Monitoring & Actions, Highest Total Expense, +.
- Page footer:** Page 5 of 5, 70%.

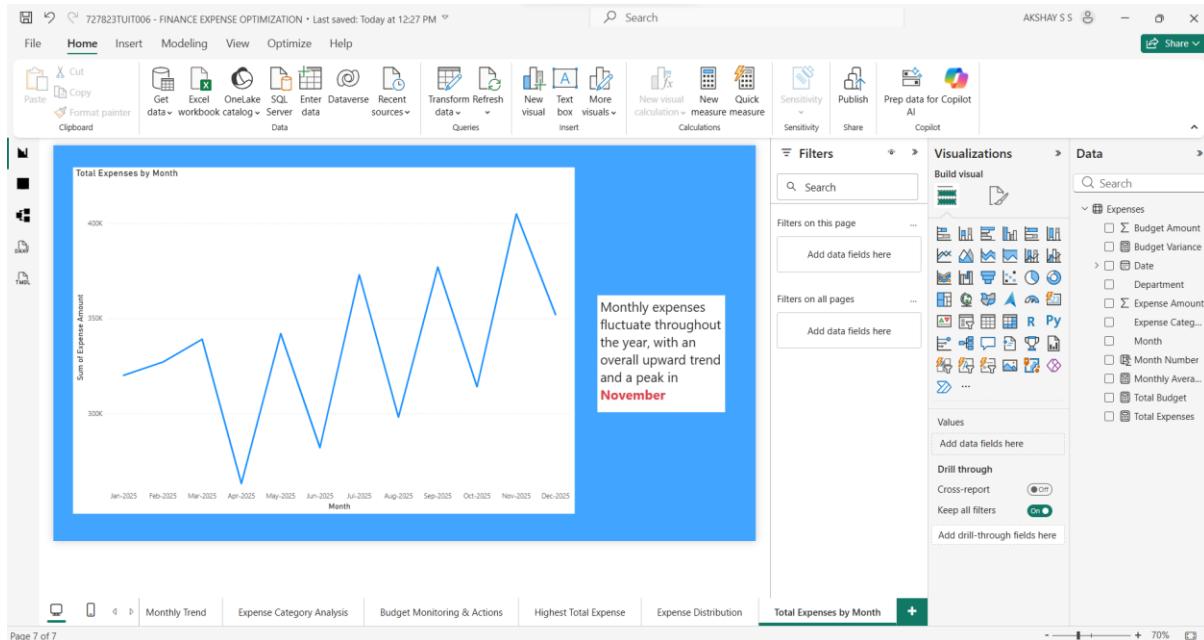
- IT department generates the highest total expenses

## Analyze expense distribution across expense types.



- A major portion of expenses is driven by Salary costs, whereas Training expenses remain minimal.

## How do monthly expenses trend over time



- The analysis shows fluctuating monthly expenses with a general increasing trend, reaching the highest level in November.

## Create DAX measures for Total Expenses and Monthly Average Expense

The screenshot shows a Power BI desktop interface with a blue-themed dashboard. Two large white cards are displayed on the dashboard, each containing a numerical value and a label: "39,92,000.00" under "Total Expenses" and "3,32,666.67" under "Monthly Average Expense". The ribbon at the top is set to the "Modeling" tab. On the right side, the "Data" pane is open, showing a list of columns and measures such as "Expenses", "Date", "Department", "Expense Category", "Expense Amount", "Budget Amount", and "Month Number". The "Values" section of the Data pane includes "Total Expenses" and "Monthly Average".

`1 Total Expenses =  
2 SUM ( Expenses[Expense Amount] )`

| Date             | Month    | Department | Expense Category | Expense Amount | Budget Amount | Month Number |
|------------------|----------|------------|------------------|----------------|---------------|--------------|
| 01 January 2025  | Jan-2025 | HR         | Salary           | ₹ 1,20,000.00  | ₹ 1,15,000    | 1            |
| 01 January 2025  | Jan-2025 | IT         | Software         | ₹ 90,000.00    | ₹ 80,000      | 1            |
| 01 January 2025  | Jan-2025 | Finance    | Utilities        | ₹ 40,000.00    | ₹ 45,000      | 1            |
| 01 January 2025  | Jan-2025 | Operations | Maintenance      | ₹ 70,000.00    | ₹ 65,000      | 1            |
| 01 February 2025 | Feb-2025 | HR         | Salary           | ₹ 1,18,000.00  | ₹ 1,15,000    | 2            |
| 01 February 2025 | Feb-2025 | IT         | Software         | ₹ 95,000.00    | ₹ 82,000      | 2            |
| 01 February 2025 | Feb-2025 | Finance    | Utilities        | ₹ 42,000.00    | ₹ 45,000      | 2            |
| 01 February 2025 | Feb-2025 | Operations | Maintenance      | ₹ 72,000.00    | ₹ 68,000      | 2            |

`1 Monthly Average Expense =  
2 AVERAGEX (  
3 | VALUES ( Expenses[Month] ),  
4 | [Total Expenses]  
5 )`

| Date             | Month    | Department | Expense Category | Expense Amount | Budget Amount | Month Number |
|------------------|----------|------------|------------------|----------------|---------------|--------------|
| 01 January 2025  | Jan-2025 | HR         | Salary           | ₹ 1,20,000.00  | ₹ 1,15,000    | 1            |
| 01 January 2025  | Jan-2025 | IT         | Software         | ₹ 90,000.00    | ₹ 80,000      | 1            |
| 01 January 2025  | Jan-2025 | Finance    | Utilities        | ₹ 40,000.00    | ₹ 45,000      | 1            |
| 01 January 2025  | Jan-2025 | Operations | Maintenance      | ₹ 70,000.00    | ₹ 65,000      | 1            |
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| 01 February 2025 | Feb-2025 | IT         | Software         | ₹ 95,000.00    | ₹ 82,000      | 2            |
| 01 February 2025 | Feb-2025 | Finance    | Utilities        | ₹ 42,000.00    | ₹ 45,000      | 2            |
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- Total expenses amount to ₹39.92 lakh, with an average monthly spending of ₹3.33 lakh.

## Compare actual expenses against budget using visuals.

The screenshot shows a bar chart titled "Total Expenses vs Total Budget by Department". The Y-axis represents "Total Expenses and Total Budget" from 0M to 1.2M. The X-axis lists four departments: IT, HR, Operations, and Finance. Blue bars represent "Total Expenses" and dark blue bars represent "Total Budget". The chart shows that IT, HR, and Operations have exceeded their budgets, while the Finance department remains within budget. A callout box highlights this information.

| Department | Total Expenses | Total Budget |
|------------|----------------|--------------|
| IT         | 1.18M          | 1.14M        |
| HR         | 1.19M          | 1.12M        |
| Operations | 0.99M          | 0.91M        |
| Finance    | 0.53M          | 0.54M        |

- Actual expenses for IT, HR, Operations are higher than their allocated budgets, whereas Finance spending stays within the planned budget.

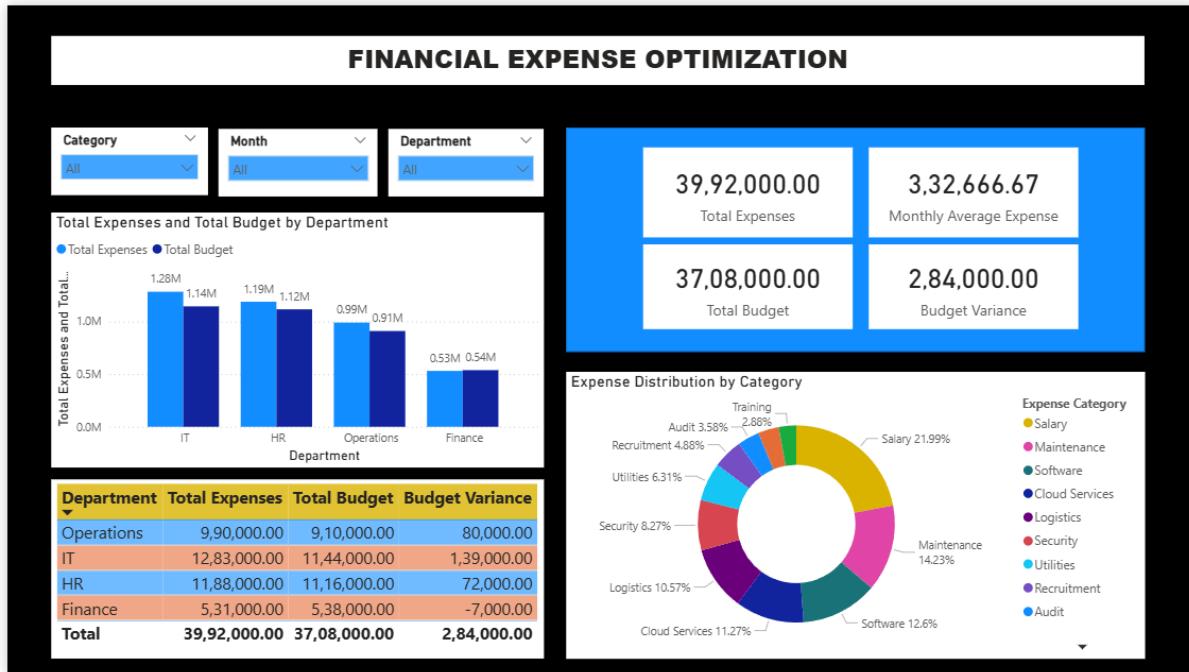
## Identify departments exceeding budget limits.

The screenshot shows a table titled "Department Total Budget Total Expenses Budget Variance". The table compares the total budget, total expenses, and variance for four departments: Operations, IT, HR, and Finance. The variance column uses color coding: red for positive variance (IT, HR, Operations) and green for negative variance (Finance). The total variance is 2,84,000.00.

| Department   | Total Budget        | Total Expenses      | Budget Variance    |
|--------------|---------------------|---------------------|--------------------|
| Operations   | 9,10,000.00         | 9,90,000.00         | 80,000.00          |
| IT           | 11,44,000.00        | 12,83,000.00        | 1,39,000.00        |
| HR           | 11,16,000.00        | 11,88,000.00        | 72,000.00          |
| Finance      | 5,38,000.00         | 5,31,000.00         | -7,000.00          |
| <b>Total</b> | <b>37,08,000.00</b> | <b>39,92,000.00</b> | <b>2,84,000.00</b> |

- IT, HR, and Operations are over budget by ₹2.91L combined, while Finance is the only department under budget, saving ₹7K.

## Design a financial monitoring dashboard



## What cost-control actions can be recommended?

- Focus on IT and HR departments, as they incur the highest expenses, and review major cost drivers.
- Reduce salary and maintenance costs, since they contribute the largest share of total expenses.
- Enforce strict budget monitoring for departments exceeding budget limits to prevent overspending.
- Optimize vendor contracts for software, cloud services, and logistics to lower recurring costs.
- Track monthly expense spikes and introduce spending caps during high-expense periods.
- Implement regular budget vs actual reviews using dashboards for early corrective action.

Target high-spending departments and categories while continuously monitoring budget variance to control overall expenses.

## **Conclusion**

The Financial Expense Optimization dashboard provides a comprehensive view of organizational spending by department, category, and time period. The analysis highlights key cost drivers, identifies departments exceeding budget limits, and reveals monthly expense trends. By leveraging interactive Power BI visuals and DAX measures, the organization can effectively monitor expenses, control budget variances, and make data-driven decisions. Overall, this project enables better financial planning, improved cost control, and supports proactive actions to optimize expenses and enhance financial efficiency.