IT EXPENSES ANALYSIS DASHBOARD

A PROJECT REPORT

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For

22ADF01 DATA ANALYSIS

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

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EXAMINER I **EXAMINER II**

ABSTRACT

The analysis of IT expenses is essential for organizations to optimize resource allocation, enhance return on investment (ROI), and align technology spending with strategic goals. This study examines key cost components, including hardware, software, cloud services, personnel, and cybersecurity, while also addressing emerging trends like AI adoption. Using data analysis and visualization, it identifies spending patterns, inefficiencies, and areas for improvement by benchmarking against industry standards. The research highlights the benefits of strategic decisions such as adopting cloud computing and automation to manage costs effectively. Recommendations include regular expense reviews, cost-benefit analysis of new technologies, and implementing robust forecasting and risk mitigation strategies. By streamlining IT budgets, organizations can achieve greater efficiency and maximize the value derived from their technology investments in a rapidly evolving digital landscape.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The growing dependence on IT infrastructure has resulted in a steady increase in IT expenses across businesses, primarily driven by the need to enhance operational efficiency and support digital innovation. Understanding the primary expense drivers, such as costs associated with hardware, software, cloud services, cybersecurity, and personnel, is critical for effective budget optimization. Benchmarking these costs against industry standards is essential to identify any areas of overspending or underspending, which can lead to improved financial efficiency. Strategic resource allocation, where investments are segmented by department or project, enables organizations to focus on areas with the highest return on investment (ROI) and align expenditures with broader business goals. Additionally, addressing risks associated with unforeseen IT expenses and prioritizing scalable, future-ready solutions ensures long-term cost-effectiveness and better equips organizations to thrive in a rapidly evolving, technology.

1.2 Data Collection

The process of data collection involves systematically gathering, measuring, and analyzing information to generate insights for research. It forms the foundation for evaluating hypotheses and drawing conclusions, making it an essential step in any research process. Depending on the research domain, the methods and tools for data collection vary significantly.

Dataset

The dataset for this study focuses on IT expenses and has been provided in a file format named "it_expenses_dataset.csv." The dataset includes one table with specific details:

- **Number of Rows:** 3,000
- **Number of Columns:** 20
- **Column Names:**
  - Employee ID
  - Employee Name
  - Department
  - Designation
  - Expense Date
  - Expense Category
  - Expense Description
  - Vendor
  - Expense Amount
  - Expense Currency
  - Approval Status
  - Payment Method
  - Project Name
  - Project ID
  - Country
  - City
  - Manager Name

- Submission Date
- Reimbursement Status
- Payment Date

1.2 PROBLEM STATEMENT

Organizations increasingly depend on IT infrastructure and digital solutions to drive innovation, efficiency, and competitiveness. However, the rapid growth of IT investments often leads to challenges in managing and optimizing expenses. Issues such as overspending on unnecessary tools, underutilization of resources, and lack of alignment between IT budgets and organizational goals hinder cost efficiency. Additionally, limited insights into expense trends, inadequate benchmarking against industry standards, and poor allocation of resources exacerbate financial inefficiencies. This creates a pressing need for a structured analysis of IT expenses to identify inefficiencies, optimize spending, and ensure that IT investments deliver maximum value while aligning with strategic objectives.

1.3 BUSINESS OBJECTIVE

1. Enhance financial efficiency by optimizing IT expense allocation.
2. Improve ROI by identifying and addressing inefficiencies in IT spending.
3. Enable targeted cost management through segmentation by department, project, or geography.
4. Perform benchmarking and trend analysis to understand industry expense standards.
5. Support strategic decision-making using data-driven insights from IT expenditure analysis.

ABOUT POWER BI:

1. Power BI, a business analytics tool by Microsoft, enables interactive data visualization and analysis, allowing organizations to understand and share insights effectively. It transforms raw data into meaningful reports and dashboards, empowering users to make informed decisions.

2. Power BI centralizes critical metrics and financial goals, enabling businesses to track progress and align expenses with organizational objectives. Its intuitive interface and collaborative features enhance usability and teamwork.

3. In the fast-paced IT sector, organizations need tools to efficiently analyze vast datasets related to expenses. Power BI simplifies this by visualizing key spending patterns and insights dynamically.

4. Dashboards created in Power BI help stakeholders quickly grasp IT expense trends, identify areas for optimization, and make data-driven decisions to

enhance financial strategies.

5. With its powerful Business Intelligence capabilities, Power BI streamlines expense analysis, promotes transparency, and supports long-term financial planning in IT operations.

CHAPTER 2

DATA PREPARATION AND MODELING

2.1 DATA CLEANING

Data cleaning is essential when analyzing IT expenses, as the data may contain inconsistencies or inaccuracies that can affect the analysis. The goal of data cleaning in IT expense analysis is to ensure that the financial data, system usage logs, or any associated metrics are accurate and reliable.

- Missing Values: IT expense data often includes missing values, which can occur for various reasons such as incomplete invoices or unreported usage data. Several strategies can be used to handle these missing values:
  - Disregarding Rows: If a record has too many missing values, it may be discarded from the dataset, especially if it cannot be reliably reconstructed.
  - Manual Filling: Missing data can be filled by manually entering the appropriate values based on historical patterns or information from other sources, such as vendor agreements or previous expense records.
  - Global Constants: Sometimes, missing values can be replaced with a global constant, such as zero or a standard value representing no expense.
  - Mean Substitution: If the missing data pertains to numerical values, the mean of the available values for that particular attribute can be used to fill in the gaps.
  - Imputation with Most Likely Value: The most frequent or most likely value can be used to replace missing data, such as replacing missing expense categories with the most common category for similar transactions.

2.2 DATA TRANSFORMATION

Data transformation in IT expense analysis involves changing raw data into a more usable and insightful format. This can include aggregating, filtering, or converting the data into structures that facilitate detailed financial reporting or trend analysis.

1. Format and Structure Conversion: IT expense data may come from various sources, such as invoices, system logs, or budget reports, in different formats (e.g., spreadsheets, databases, or text files). The first step is transforming these data into a consistent format that can be easily analyzed.
2. Data Integration: IT expenses may be spread across different departments, systems, or vendors. Transformation techniques are employed to integrate data from multiple sources, ensuring that all expenses are accounted for in a single

dataset.

3. Manual and Automated Procedures:

- Manual Procedures: For certain complex expenses or discrepancies, manual intervention might be required, such as validating vendor payments or manually reconciling invoices.
- Automated Procedures: Automated data transformation tools can be used for tasks like categorizing expenses, converting currency, or applying exchange rates for international transactions.

4. Data Profiling and Visualization: Tools like data profiling help to analyze the quality of IT expense data, identifying patterns and potential issues such as duplicate entries or inconsistencies. Data visualization tools can then help present the expenses in a way that is easy to understand, such as through dashboards or graphs.
5. Data Purification: This process involves cleaning up any anomalies in the data, such as incorrect expense codes or outdated vendor information. Purified data is necessary for accurate reporting and forecasting.
6. Final Transformation: Once the data is cleaned, transformed, and integrated, it is ready for analysis. This final dataset is structured in a way that allows for in-depth analysis, such as identifying trends in IT spending, forecasting future costs, or determining the cost-effectiveness of certain IT projects**.**

PROCEDURE

STEP 1

1. Go to HOME tab in ribbon.
2. Click on GET DATA and select data from the system or from any platform where it resides.
3. Here select 4 different tables of CSV format from system and load it to POWER BI.

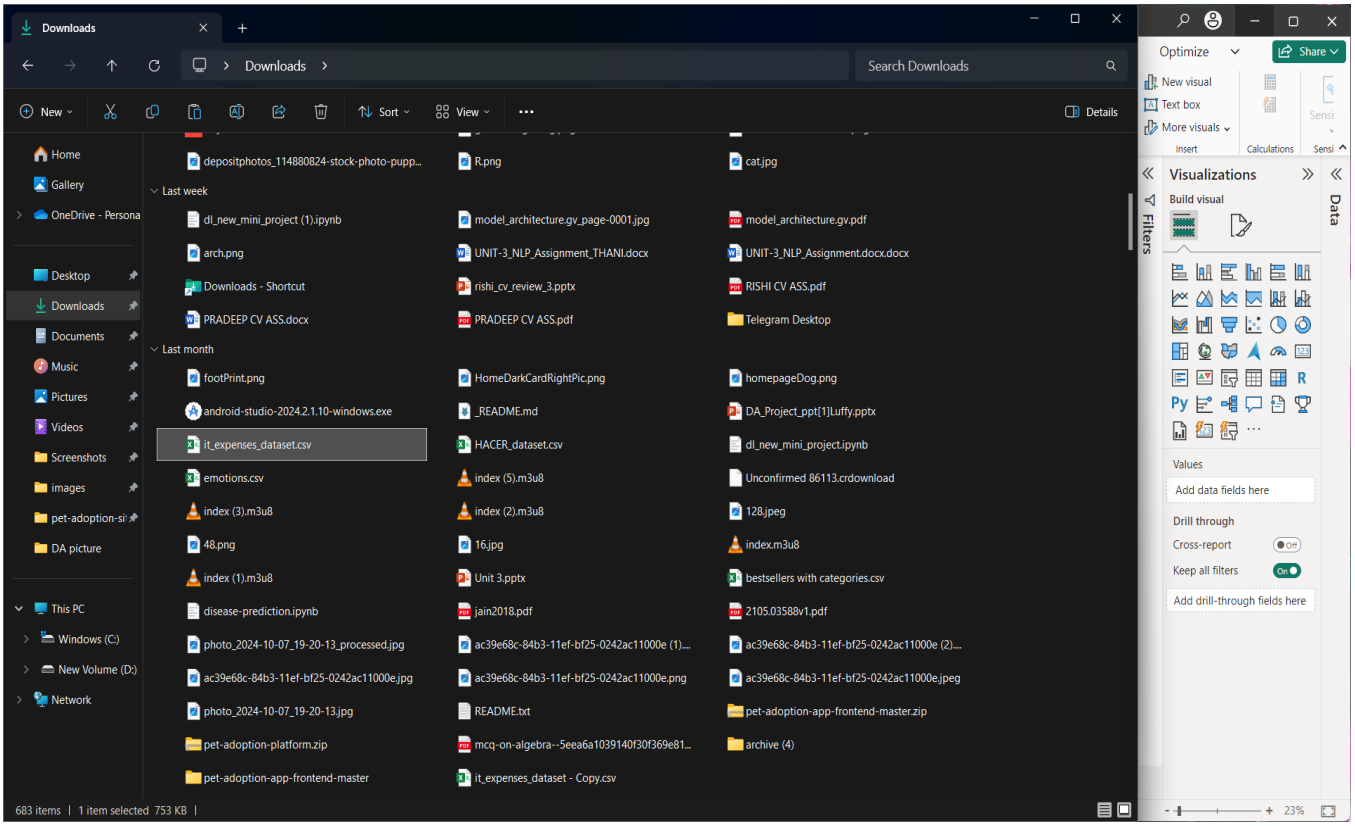


Figure 2.2.1 Select Dataset

STEP 2

1. From the ribbon of HOME tab select TRANSFORM DATA in order to clean and transform data.

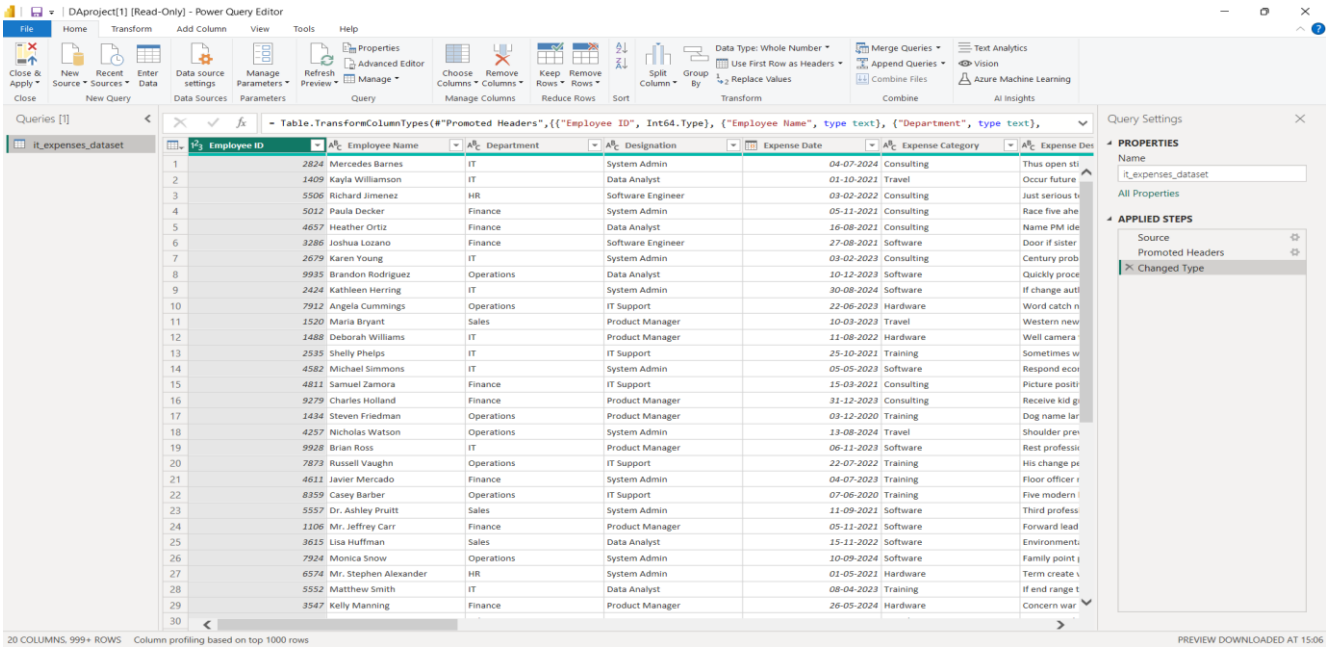


Figure 2.2.2Transform Data

STEP 3

1. After choosing transforming data all the loaded tables and opened in POWER QUERY EDITOR, sothat we can make any changes as per our wish.
2. Then open the SUMMARY table and replace the values which are blank.
3. Then try to add NULL values to the rows in which the matches are cancelled due to some reasons.

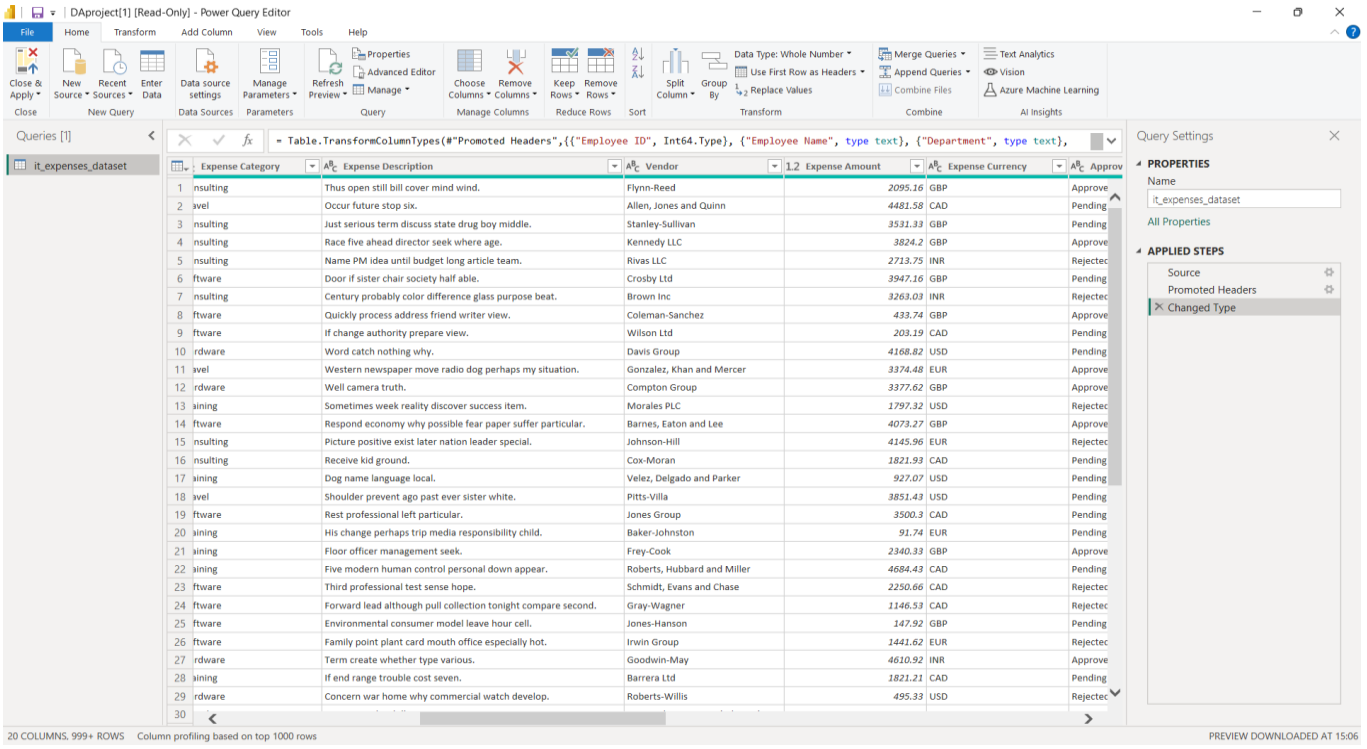


Figure 2.2.3 Power Query Editor

STEP 4

1. Then on same SUMMARY table apply REPLACE VALUES.
2. In this select any column that need new values to be replaced for further processing.

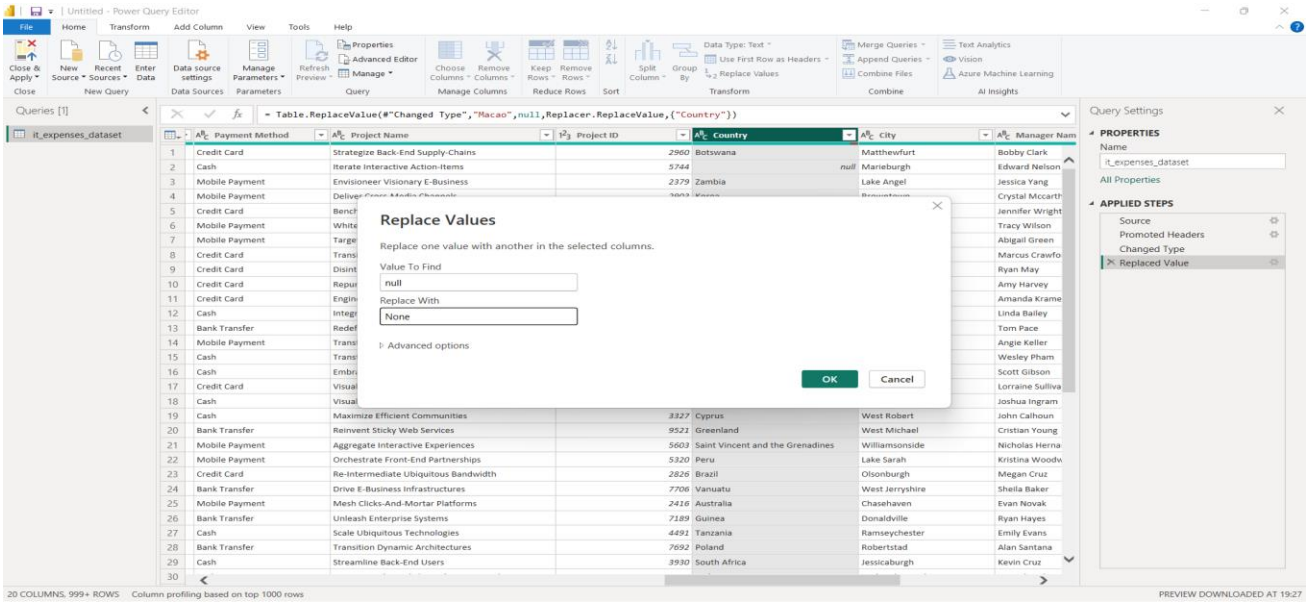


Figure 2.24 Replace Value

STEP 5

1. Now select IT_EXPENSES table to clean it.
2. Here applies change datatype so click the column that needed to change the datatype.
3. Select “Expense Amount” column then change its datatype to decimal.

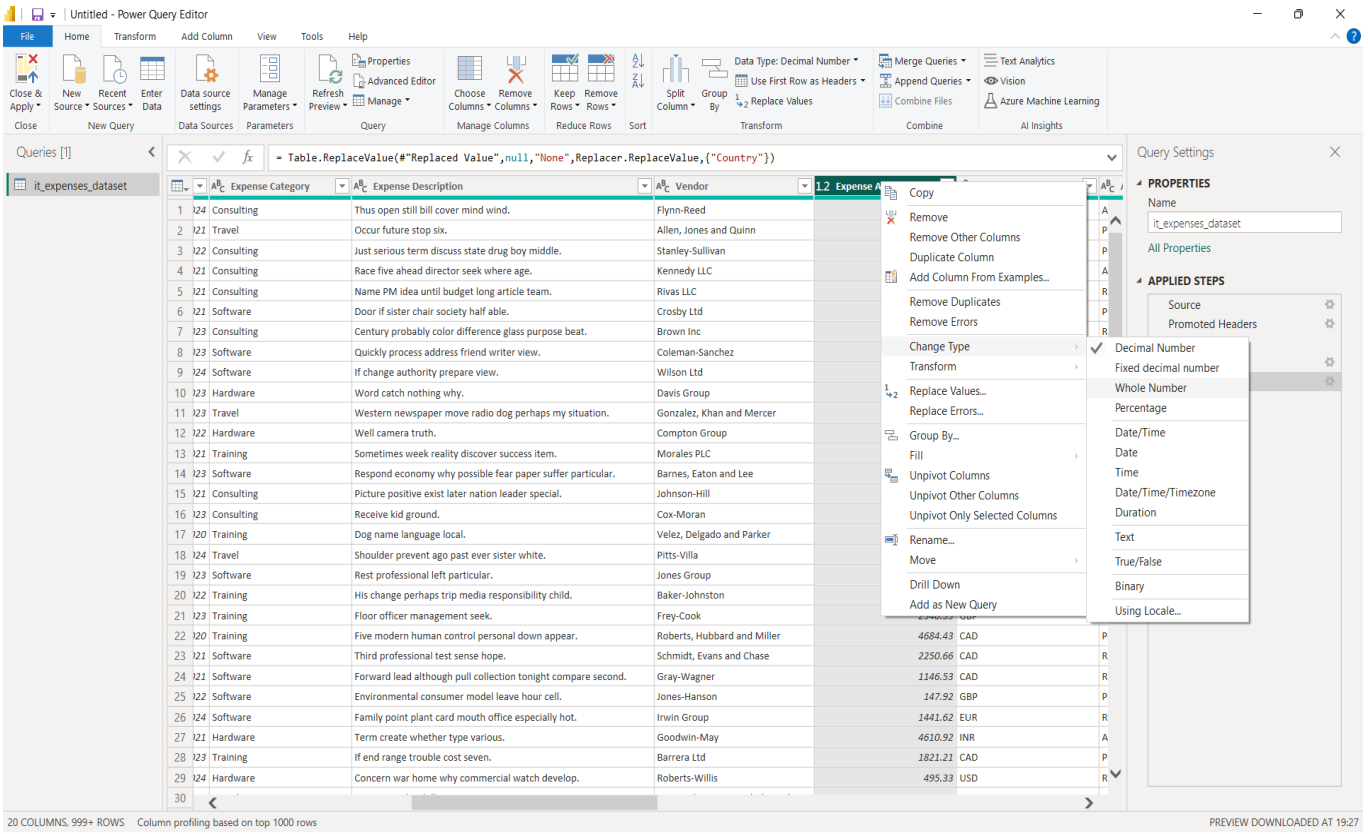


Figure 2.2.5 Change Column Type

STEP 6

1. Now select IT_EXPENSES table in order to apply SPLIT COLUMN.
2. It is needed to split a particular column so that data can be accessed easily.
3. Select column to be splited, RIGHT CLICK the column.
4. Drop down the list displays and select SPLIT COLUMN.
5. Then select split column by DELIMITER.
6. Similarly, we can also split column by using delimiters such as comma, colon, semi solon, hyphen,etc...
7. Now split the column “PAYMENT_DATE” from IT EXPENSES table into three different columns by using delimiter “-”.
8. Then rename the newly created columns as “DAY”, “MONTH”and “YEAR”.

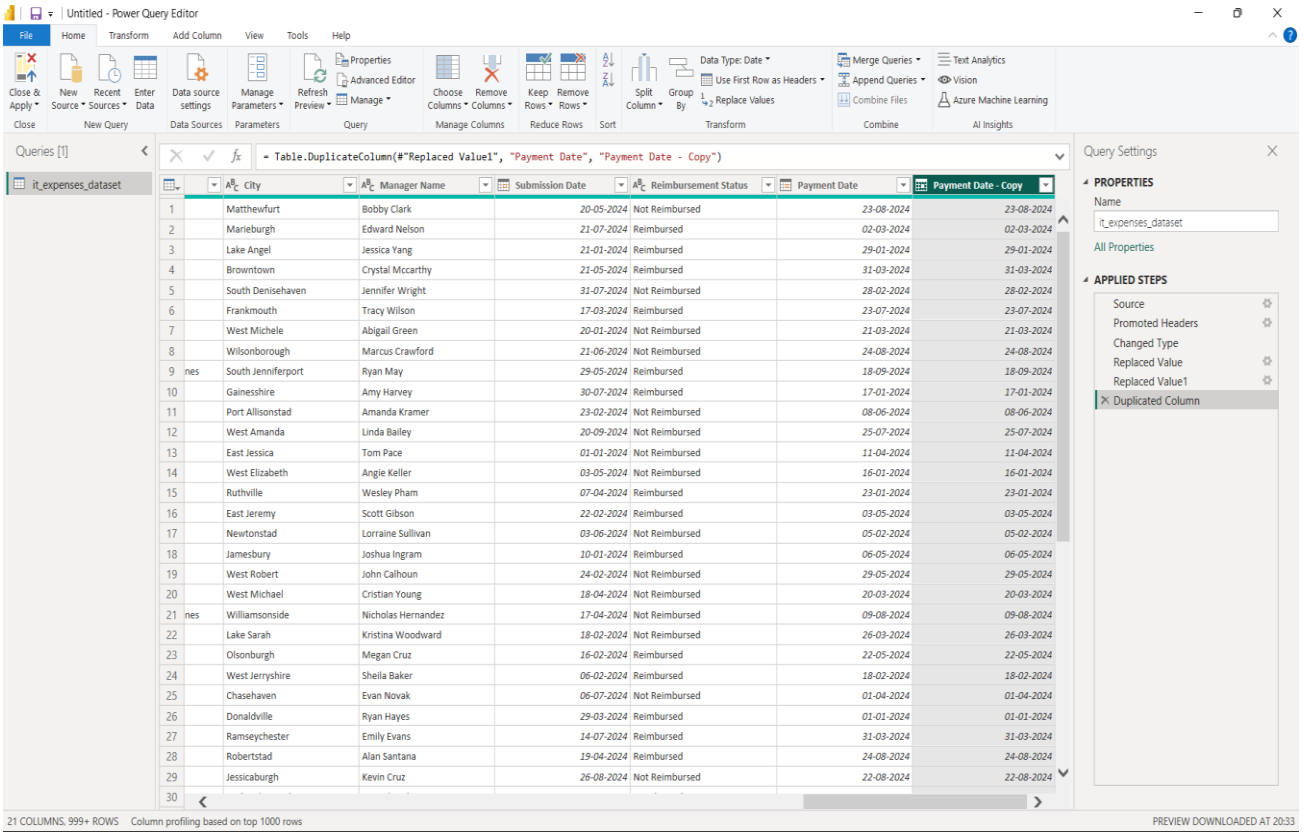


Figure 2.2.6 Split Column Selection

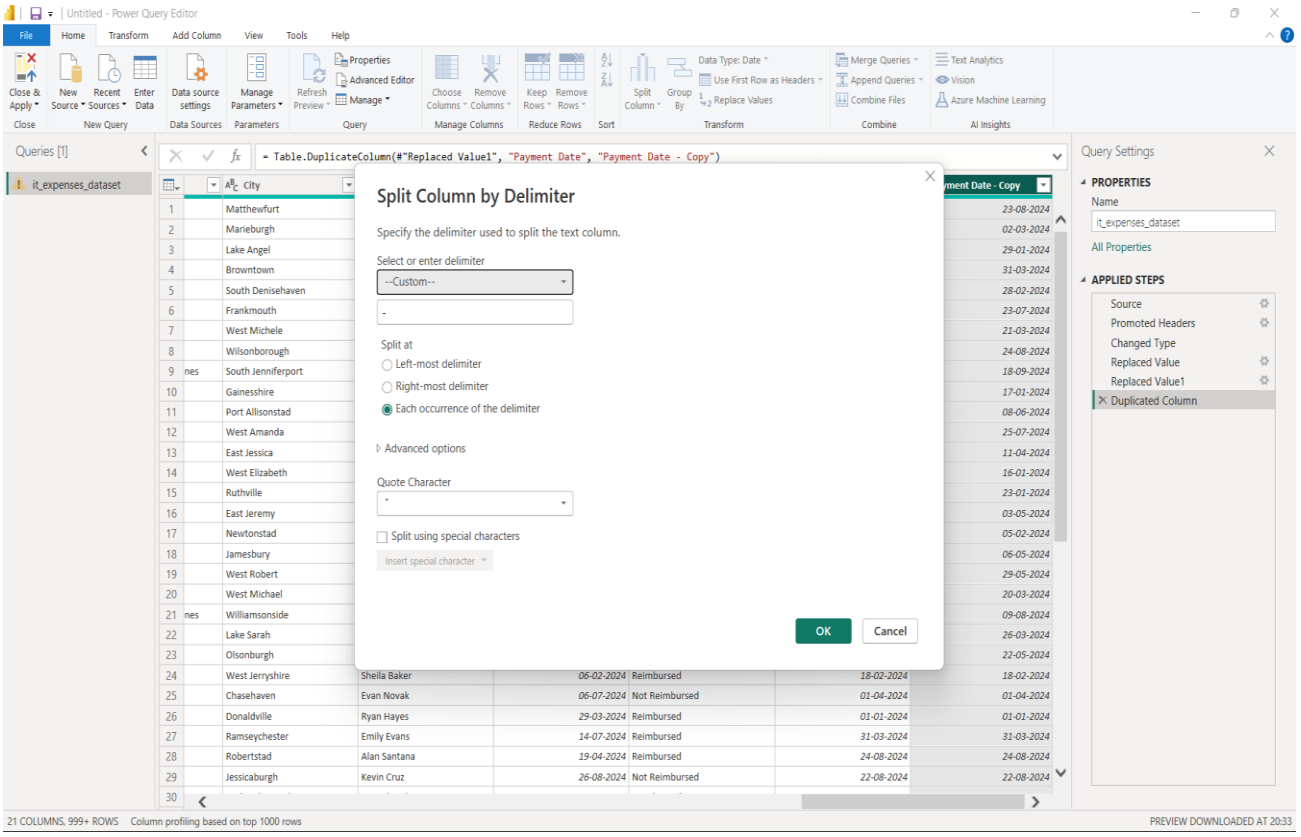


Figure 2.2.7 Split Column by Delimiter

2.3. DATA MODELLING

Data modelling is one of the aspects used in BI tools to establish relationships between various data sources. When using several data sources, you can construct engaging data visualizations by defining the relationships between them.

It can create unique calculations on the already-existing tables using the modelling capability, and these columns can then be easily displayed in Power BI visualizations. This enables companies to create new measures and perform unique calculations for them.

Data Modeling is used to create relationship among the different tables inorder to access the data of different tables to visualize them. There are four types of relations that we can create as,

- One to One relationship
- One to Many relationship
- Many to One relationship
- Many to Many relationship

PROCEDURE
STEP 1:

1. Here start merging of columns to create relationship.
2. Select “IT_EXPENSES” and “EXPENSES” tables then merge them by using common attribute called as“DATE” of both tables which act as primary key.

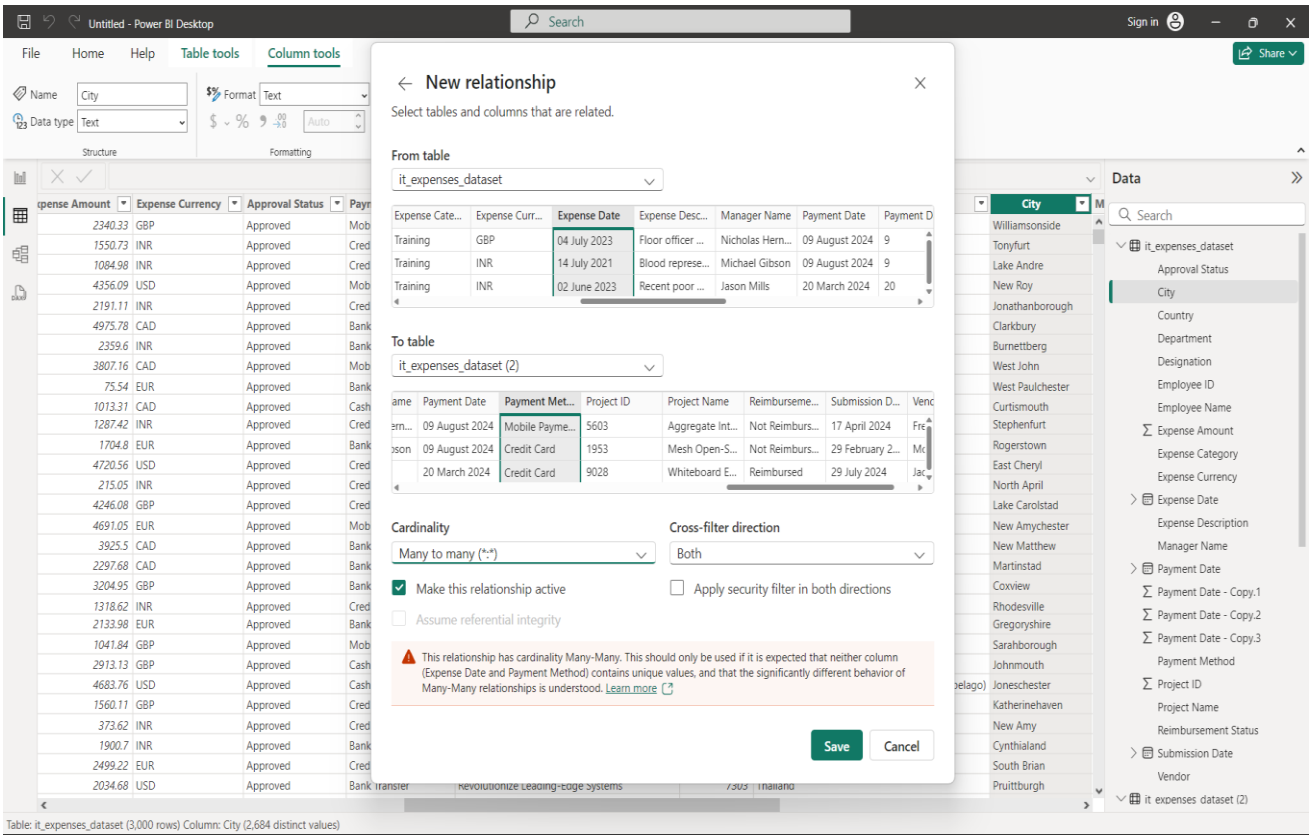


Figure 2.3.1 Merge Tables “IT_EXPENSES” and “EXPENSES”

STEP 2

1. Select the tables “details” and “summary” to merge them.
2. Merge them by choosing DATE attributes from both tables.

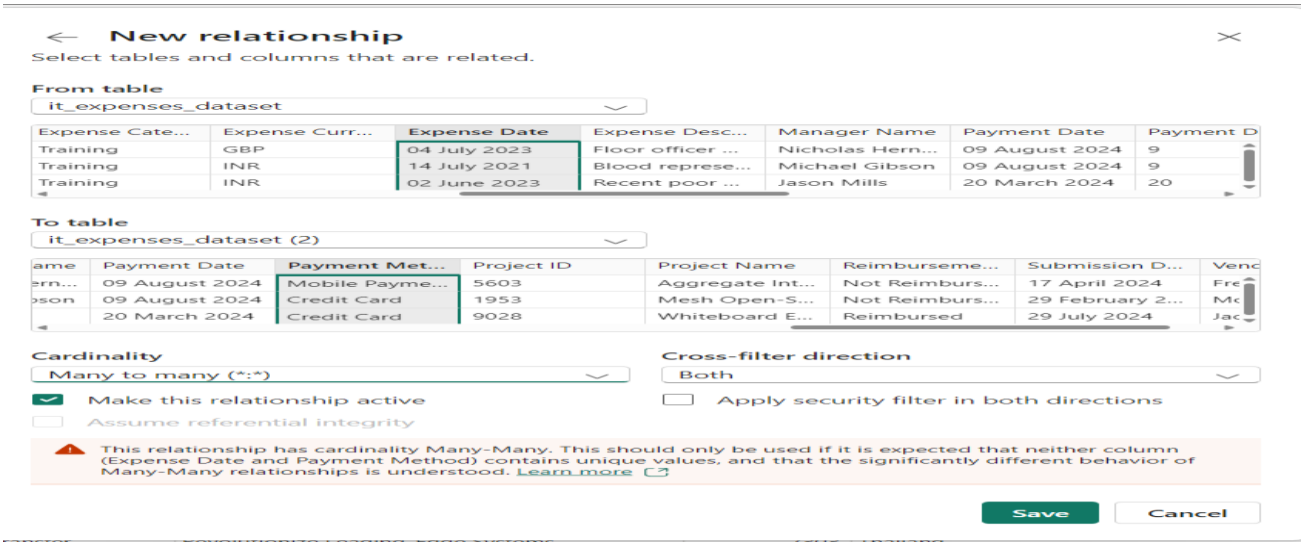
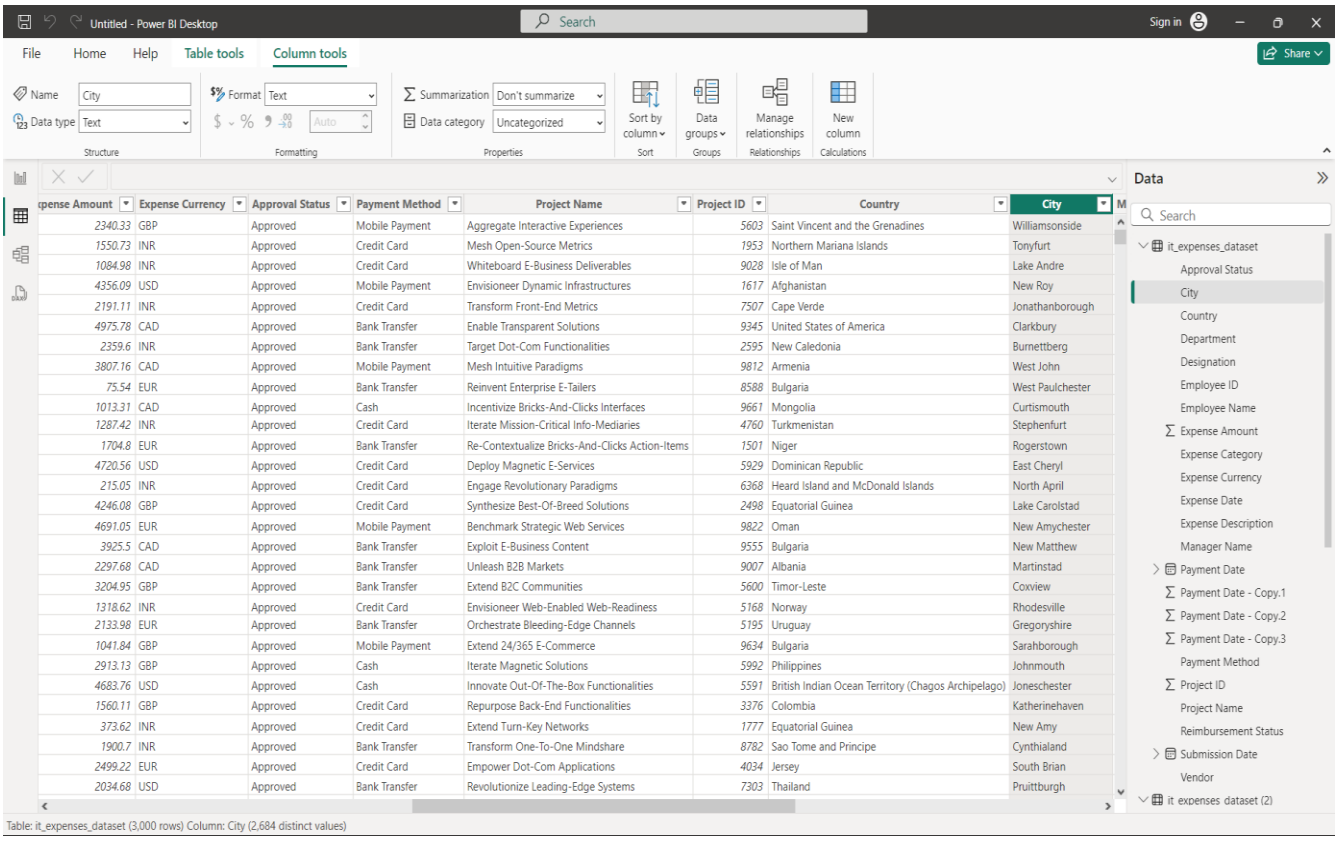


Figure 2.3.2 Merge tables “IT_EXPENSES” and “EXPENSES”

STEP 3

1. After applying changes and merging tables select “close” and “apply” from ribbon of Power queryEditor.
2. At Power bi desktop it displays table as visualised below Figure 2.3.4.



xpense Amount	Expense Currency	Approval Status	Payment Method	Project Name	Project ID	Country	City
2340.33	GBP	Approved	Mobile Payment	Aggregate Interactive Experiences	5603	Saint Vincent and the Grenadines	Williamsonside
1550.73	INR	Approved	Credit Card	Mesh Open-Source Metrics	1953	Northern Mariana Islands	Tonyfurt
1084.98	INR	Approved	Credit Card	Whiteboard E-Business Deliverables	9028	Isle of Man	Lake Andre
4356.09	USD	Approved	Mobile Payment	Envisioneer Dynamic Infrastructures	1617	Afghanistan	New Roy
2191.11	INR	Approved	Credit Card	Transform Front-End Metrics	7507	Cape Verde	Jonathanborough
4975.78	CAD	Approved	Bank Transfer	Enable Transparent Solutions	9345	United States of America	Clarkbury
2359.6	INR	Approved	Bank Transfer	Target Dot-Com Functionalities	2595	New Caledonia	Burnettberg
3807.16	CAD	Approved	Mobile Payment	Mesh Intuitive Paradigms	9812	Armenia	West John
75.54	EUR	Approved	Bank Transfer	Reinvent Enterprise E-Tailers	8588	Bulgaria	West Paulchester
1013.31	CAD	Approved	Cash	Incentivize Bricks-And-Clicks Interfaces	9661	Mongolia	Curtismouth
1287.42	INR	Approved	Credit Card	Iterate Mission-Critical Info-Mediaries	4760	Turkmenistan	Stephenfurt
1704.8	EUR	Approved	Bank Transfer	Re-Contextualize Bricks-And-Clicks Action-Items	1501	Niger	Rogerstown
4720.56	USD	Approved	Credit Card	Deploy Magnetic E-Services	5929	Dominican Republic	East Cheryl
215.05	INR	Approved	Credit Card	Engage Revolutionary Paradigms	6368	Heard Island and McDonald Islands	North April
4246.08	GBP	Approved	Credit Card	Synthesize Best-Of-Breed Solutions	2498	Equatorial Guinea	Lake Carolstad
4691.05	EUR	Approved	Mobile Payment	Benchmark Strategic Web Services	9822	Oman	New Amychester
3925.5	CAD	Approved	Bank Transfer	Exploit E-Business Content	9555	Bulgaria	New Matthew
2297.68	CAD	Approved	Bank Transfer	Unleash B2B Markets	9007	Albania	Martinstad
3204.95	GBP	Approved	Bank Transfer	Extend B2C Communities	5600	Timor-Leste	Coxview
1318.62	INR	Approved	Credit Card	Envisioneer Web-Enabled Web-Readiness	5168	Norway	Rhodesville
2133.98	EUR	Approved	Bank Transfer	Orchestrate Bleeding-Edge Channels	5195	Uruguay	Gregoryshire
1041.84	GBP	Approved	Mobile Payment	Extend 24/365 E-Commerce	9634	Bulgaria	Sarahborough
2913.13	GBP	Approved	Cash	Iterate Magnetic Solutions	5992	Philippines	Johnmouth
4683.76	USD	Approved	Cash	Innovate Out-Of-The-Box Functionalities	5591	British Indian Ocean Territory (Chagos Archipelago)	Joneschester
1560.11	GBP	Approved	Credit Card	Repurpose Back-End Functionalities	3376	Colombia	Katherinehaven
373.62	INR	Approved	Credit Card	Extend Turn-Key Networks	1777	Equatorial Guinea	New Amy
1900.7	INR	Approved	Bank Transfer	Transform One-To-One Mindshare	8782	Sao Tome and Principe	Cynthialand
2499.22	EUR	Approved	Credit Card	Empower Dot-Com Applications	4034	Jersey	South Brian
2034.68	USD	Approved	Bank Transfer	Revolutionize Leading-Edge Systems	7303	Thailand	Pruittburgh

Figure 2.3.3 Power Bi desktop after transformation.

2.4 DAX (Data Analysis Expressions)

DAX is a special function that contains collection of operators, formulae, functions, expressions to calculate, process and execute the values from existing table and return one or more values as the result of respective functions. So, it is used to create new information from the datas that already exist in the table while creating model and analyzing it.

DAX measured of Power Bi are special functions or Programming Language that are used to create the following such as

- Calculated columns
- New measures
- Customized tables
- Quick measures
- Implement Time Intelligence

There exist many formulae for creating the new columns, measures. The time intelligence are specialfunctions the are applicable only for the Time-based columns only.

So, from these formulae and expression we can find results like maximum, minimum, average, count,sum, filters, difference, total, variance, percentage, addition, subtraction, division, etc.….

STEP 1

1. Creating Quick measure for table Summary.
2. Click Quick measure at ribbon and a menu pop up
3. Measure named “Avg Expense Amount”
4. Dax Query For it.
   Average Expense Amount = AVERAGE(it_expenses_dataset[Expense Amount])

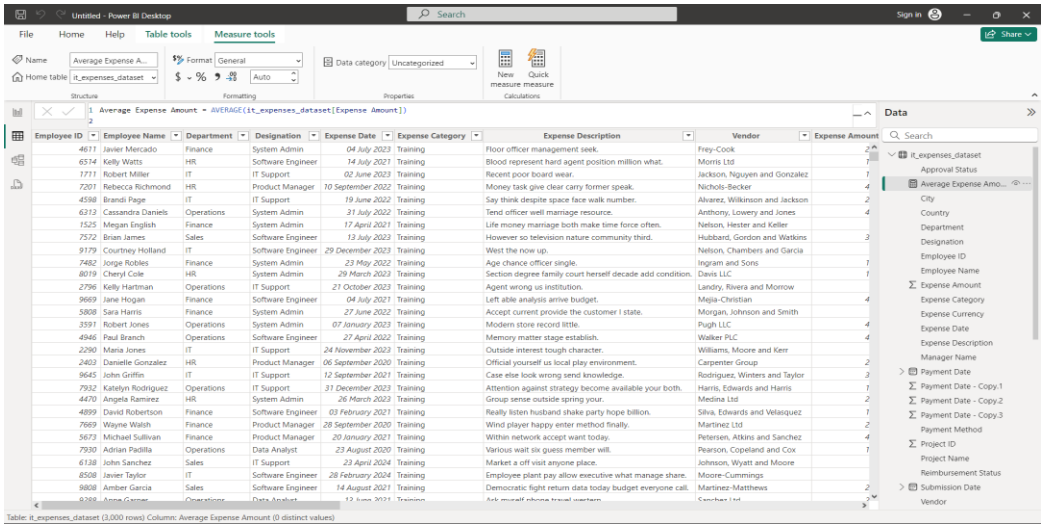


Figure 2.4.1 Quick measure “Average Expense Amount”

STEP 2

1. Creating Quick measure for table Summary.
2. Click Quick measure at ribbon and a menu pop up
3. Measure named “Most Used Payment Method”.
4. Formula for measure:

```
Most Used Payment Method =
CALCULATE(
   SELECTCOLUMNS(
      TOPN(
         1,
         SUMMARIZE(
            it_expenses_dataset,
        it_expenses_dataset[Payment Method],
            "TotalCount", COUNT(it_expenses_dataset[Payment Method])
         ),
         [TotalCount],
         DESC
      ),
      "Payment Method", it_expenses_dataset[Payment Method]
   )
)
```

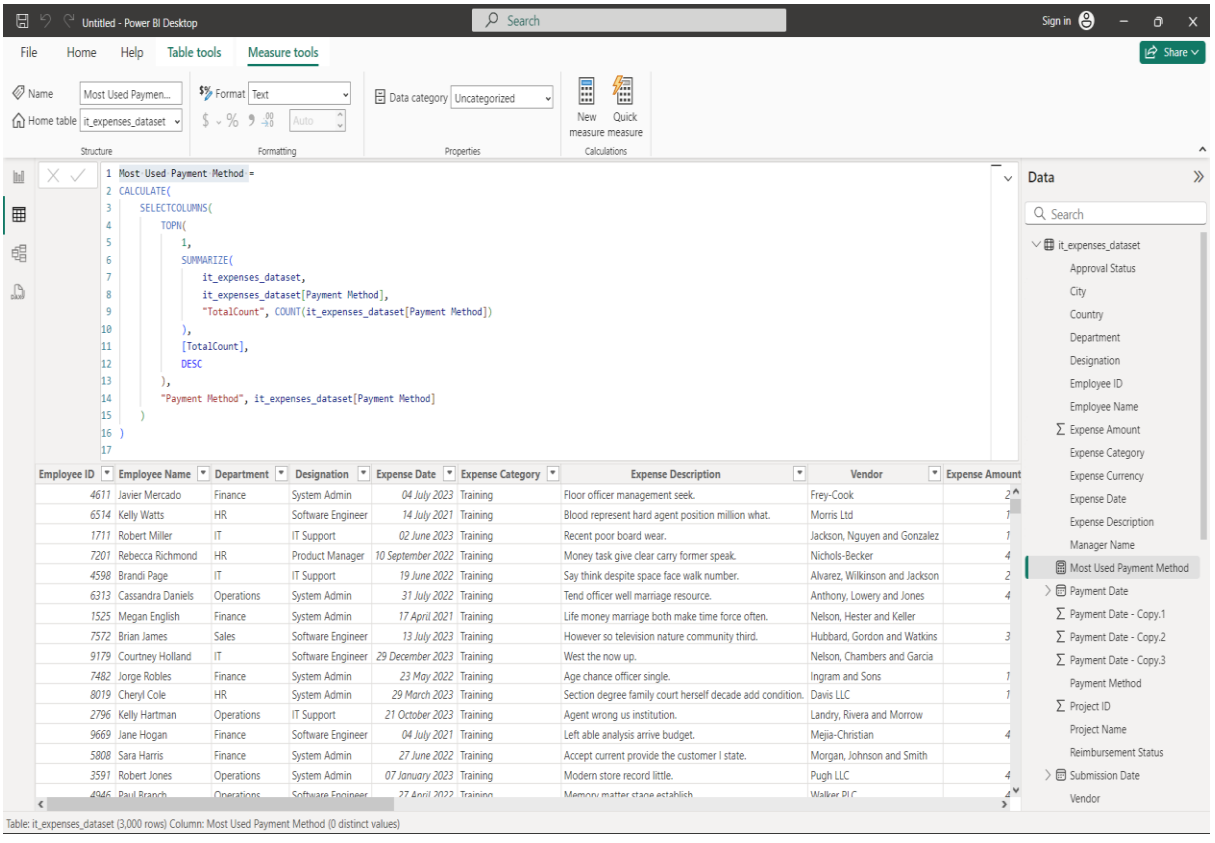


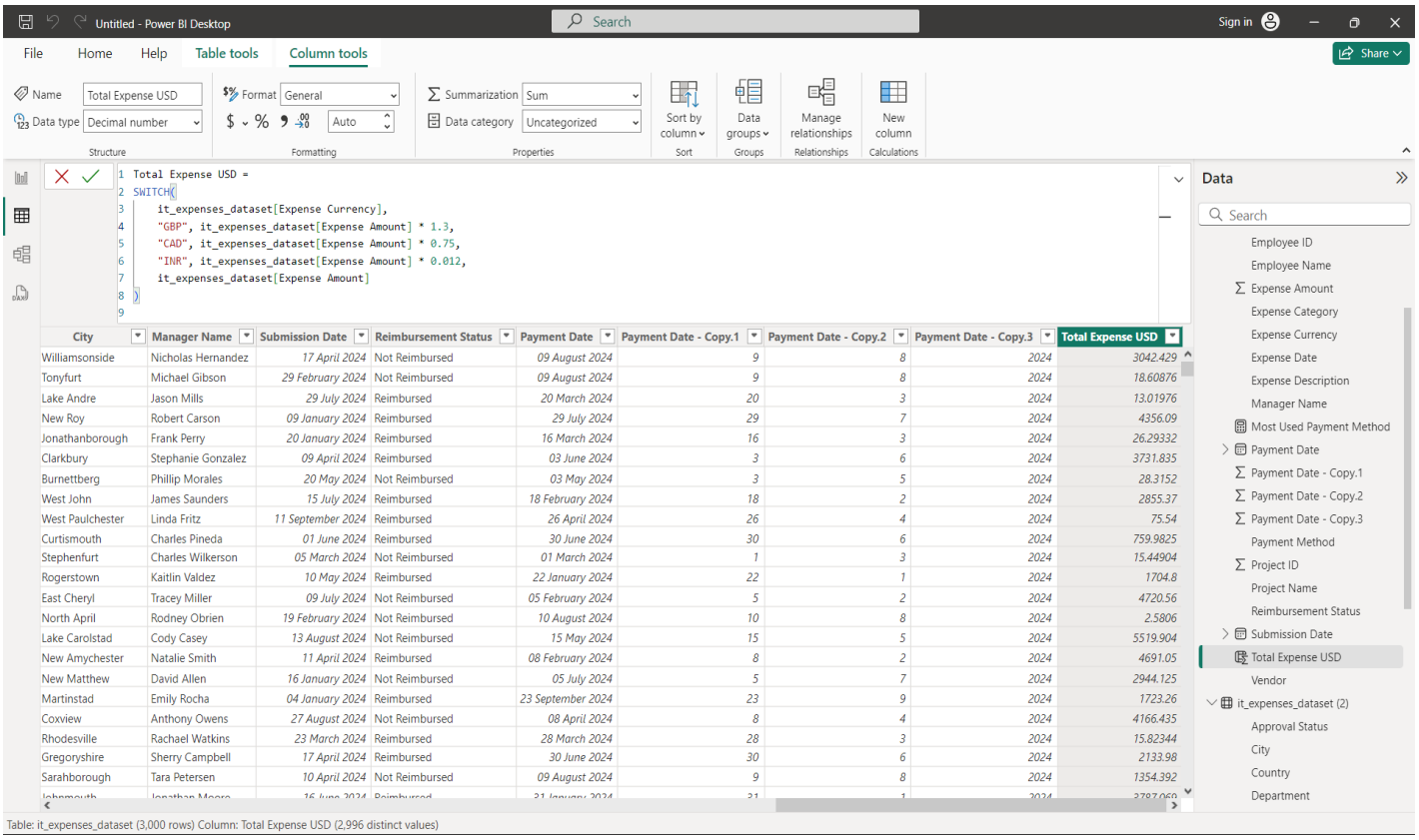
Figure 2.4.2 Quick Measure “Most Used Payment Method”

STEP 3

1. Create calculated column Summary table
2. Select table," Right click" it then selects "New column".
3. Apply formulae for new table in the given box with new name click enter

   Formula for new column:

```
Total Expense USD =
SWITCH(
    it_expenses_dataset[Expense Currency],
    "GBP", it_expenses_dataset[Expense Amount] * 1.3,
    "CAD", it_expenses_dataset[Expense Amount] * 0.75,
    "INR", it_expenses_dataset[Expense Amount] * 0.012,
    it_expenses_dataset[Expense Amount]
)
```



City	Manager Name	Submission Date	Reimbursement Status	Payment Date	Payment Date - Copy.1	Payment Date - Copy.2	Payment Date - Copy.3	Total Expense USD
Williamsonside	Nicholas Hernandez	17 April 2024	Not Reimbursed	09 August 2024	9	8	2024	3042.429
Tonyfurt	Michael Gibson	29 February 2024	Not Reimbursed	09 August 2024	9	8	2024	18.60876
Lake Andre	Jason Mills	29 July 2024	Reimbursed	20 March 2024	20	3	2024	13.01976
New Roy	Robert Carson	09 January 2024	Reimbursed	29 July 2024	29	7	2024	4356.09
Jonathanborough	Frank Perry	20 January 2024	Reimbursed	16 March 2024	16	3	2024	26.29332
Clarkbury	Stephanie Gonzalez	09 April 2024	Reimbursed	03 June 2024	3	6	2024	3731.835
Burnettberg	Phillip Morales	20 May 2024	Not Reimbursed	03 May 2024	3	5	2024	28.3152
West John	James Saunders	15 July 2024	Reimbursed	18 February 2024	18	2	2024	2855.37
West Paulchester	Linda Fritz	11 September 2024	Reimbursed	26 April 2024	26	4	2024	75.54
Curtismouth	Charles Pineda	01 June 2024	Reimbursed	30 June 2024	30	6	2024	759.9825
Stephenfurt	Charles Wilkerson	05 March 2024	Not Reimbursed	01 March 2024	1	3	2024	15.44904
Rogerstown	Kaitlin Valdez	10 May 2024	Reimbursed	22 January 2024	22	1	2024	1704.8
East Cheryl	Tracey Miller	09 July 2024	Not Reimbursed	05 February 2024	5	2	2024	4720.56
North April	Rodney Obrien	19 February 2024	Not Reimbursed	10 August 2024	10	8	2024	2.5806
Lake Carolstad	Cody Casey	13 August 2024	Not Reimbursed	15 May 2024	15	5	2024	5519.904
New Amychester	Natalie Smith	11 April 2024	Reimbursed	08 February 2024	8	2	2024	4691.05
New Matthew	David Allen	16 January 2024	Not Reimbursed	05 July 2024	5	7	2024	2944.125
Martinstad	Emily Rocha	04 January 2024	Reimbursed	23 September 2024	23	9	2024	1723.26
Coxview	Anthony Owens	27 August 2024	Not Reimbursed	08 April 2024	8	4	2024	4166.435
Rhodesville	Rachael Watkins	23 March 2024	Reimbursed	28 March 2024	28	3	2024	15.82344
Gregoryshire	Sherry Campbell	17 April 2024	Reimbursed	30 June 2024	30	6	2024	2133.98
Sarahborough	Tara Petersen	10 April 2024	Not Reimbursed	09 August 2024	9	8	2024	1354.392

FIG 2.4.5 New Column Created

STEP 4

1. Create calculated column Summary table
2. Select table," Right click" it then selects "New column".
3. Apply formulae for new table in the given box with new name click enter

   Formula for new column:

```
Approval Flag =
IF(it_expenses_dataset[Approval Status] = "Approved", 1, 0)
```

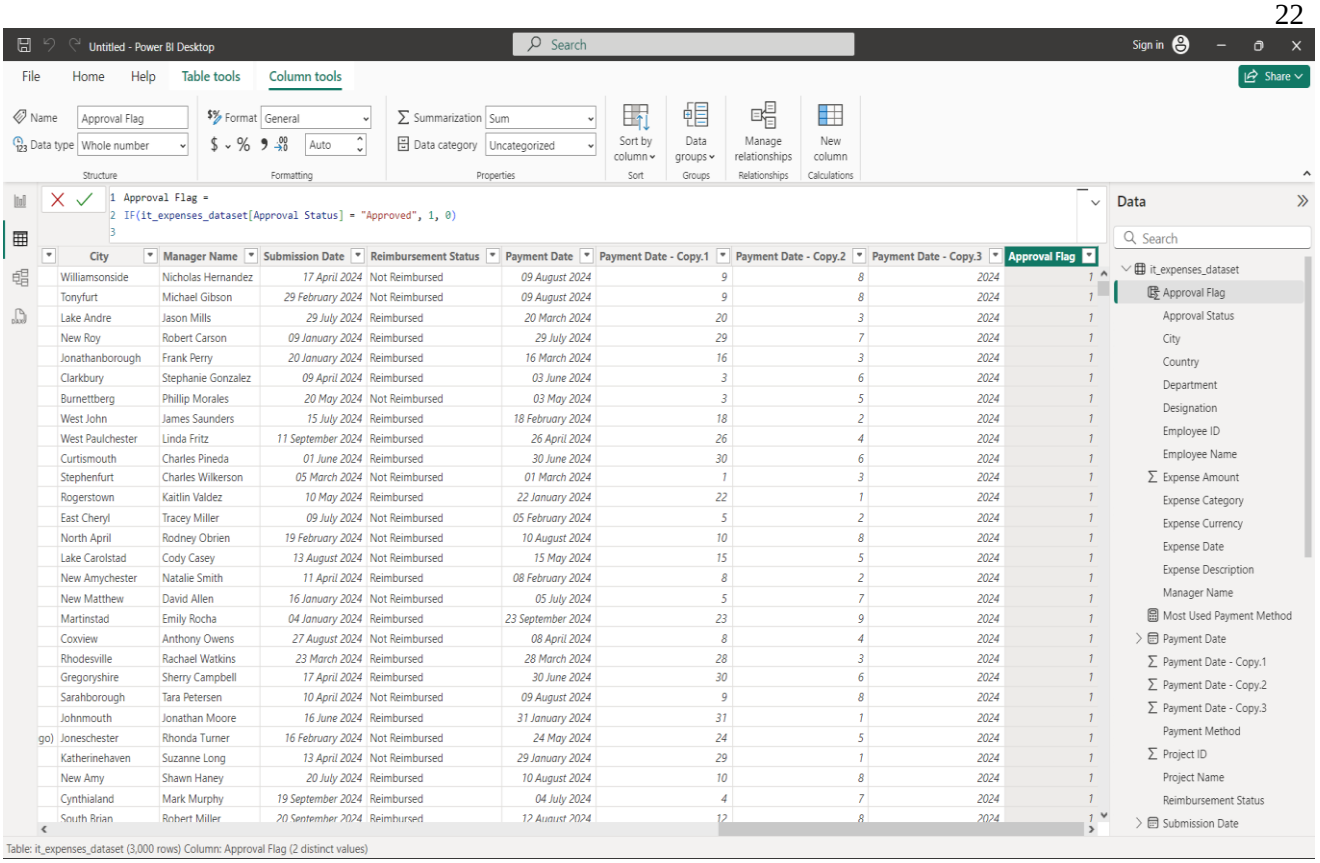


Figure 2.4.6 Creating Calculated column

STEP 7

1. Calculating count of order by using the following formula.MAX

Days to Payment =
DATEDIFF(DATEVALUE(it_expenses_dataset[Expense Date]),
DATEVALUE(it_expenses_dataset[Payment Date]), DAY)

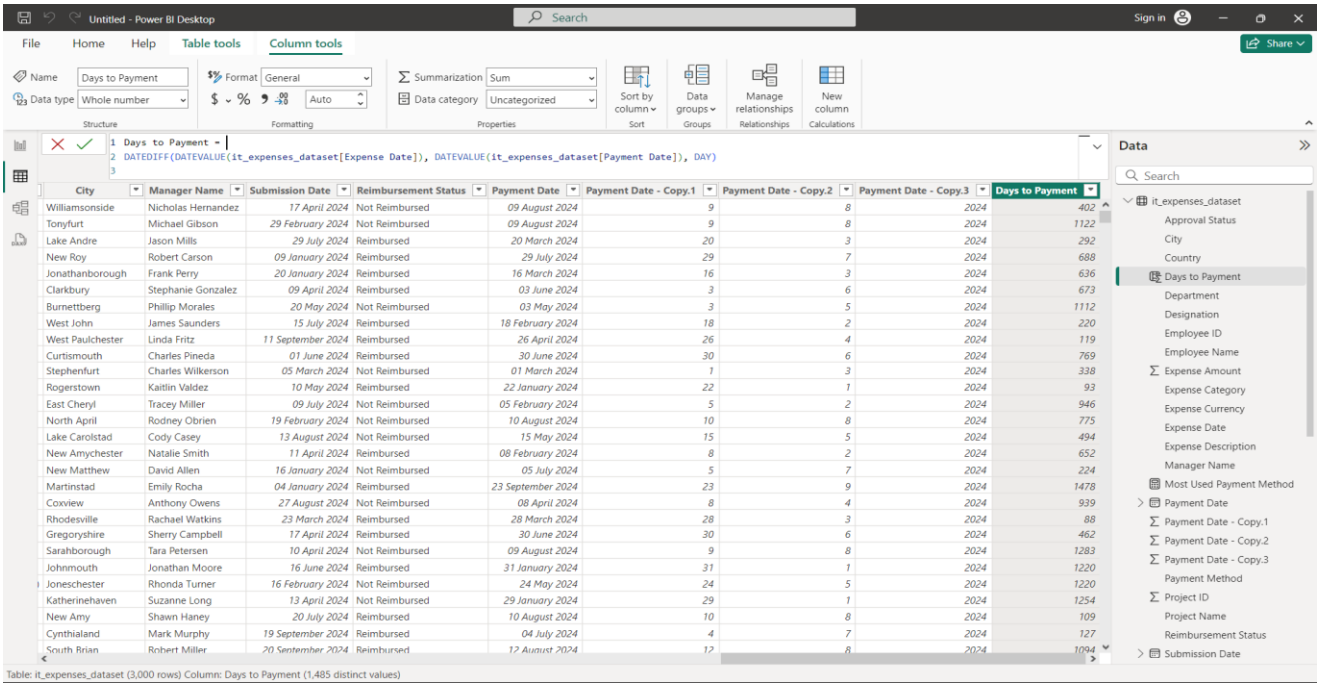


Figure 2.4.7 Calculating count of Orders

CHAPTER 3

DATA ANALYSIS AND INTERPRETATION

3.1 DATA ANALYSIS

To turn raw data into insightful information, data analysis is the process of analyzing, manipulating, and monitoring. Making the necessary decisions for a business or company's growth is made easier with the use of data insights. Deep data analysis is crucial if need want to manage a firm that is data-driven. Thenit is needed to find learning different Power BI data analysis approaches fascinating and useful.

Data analysis includes the following results

- Used to create various charts from Power Bi visuals
- Select datas from various tables, analyse it and convert it into visuals.
- From the analysed result infer the result or final solution.

CHARTS

1. What is the total expense amount per department?

i. Select table IT_EXPENSES.
ii. Include calculated measure “EXPENSE_AMOUNT” and “DEPARTMENT”
iii. Then select **card chart** for visualization.

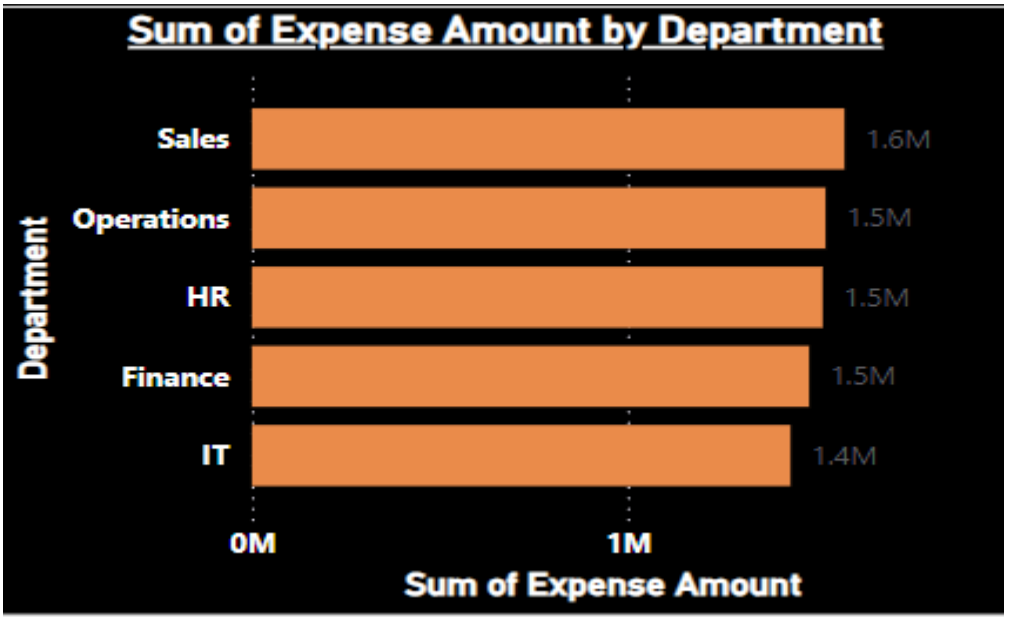


Figure 3.1.1 Total Expense Amount per Department

2. How do the total expenses vary over different months or years?

i. Select table IT_EXPENSES.

ii. Include “EXPENSE_AMOUNT”, “YEAR”.

iii. Then select **Line Chart** for visualization.

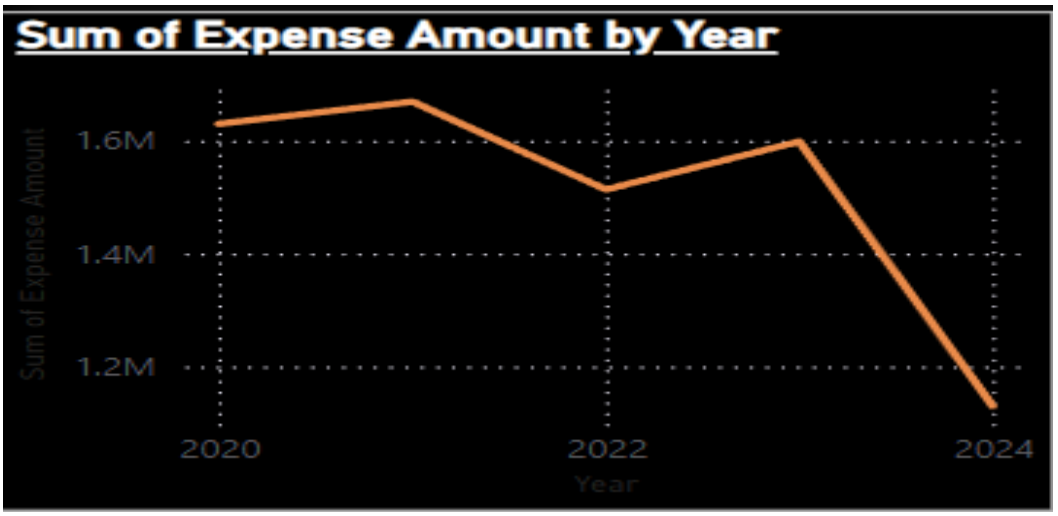


Figure 3.1.2 Total Expense over Years

3. What is the proportion of different expense categories?

i. Select IT_EXPENSES.

ii. Include calculated measure “EXPENSE AMOUNT” and “CATEGORY”

iii. Then select **Pie Chart** for visualization.

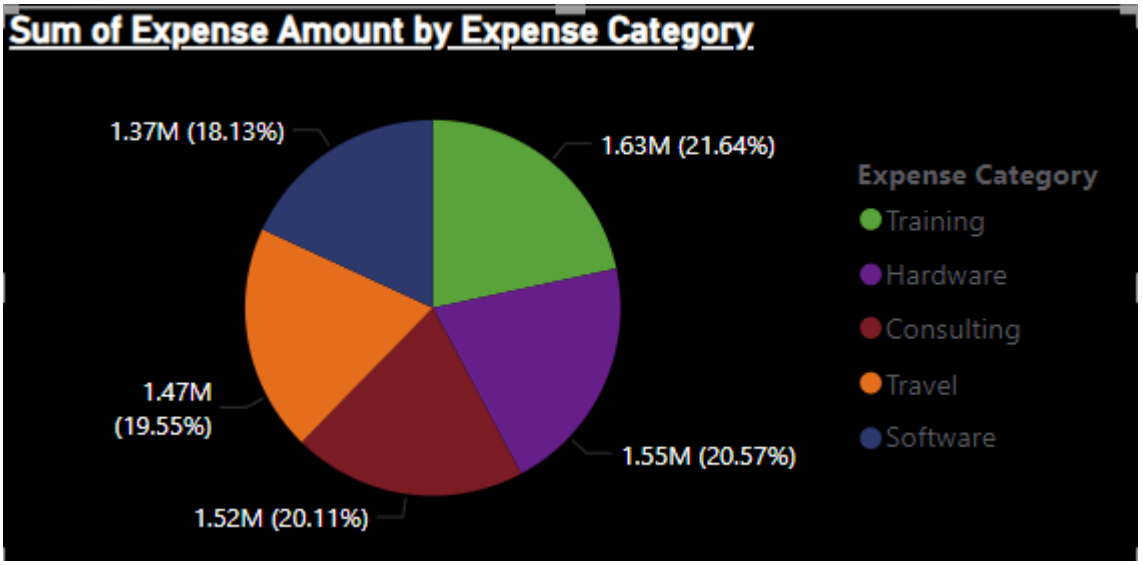


Figure 3.1.3 Average Rating by Customer

4. What is the total expense amount for each approval status?

i. Select table IT_EXPENSES.

ii. Include calculated measure "EXPENSE_AMOUNT" and "APPROVAL_STATUS".

iii. Then select **Stacked Bar chart** for visualization.

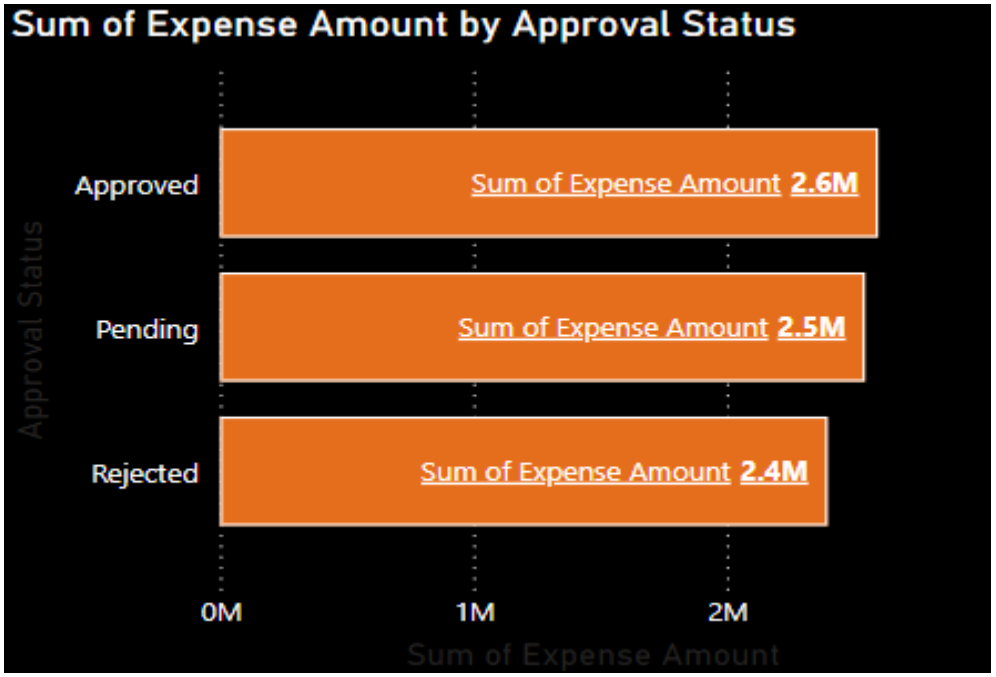


Figure 3.1.4 Total expense amount for each approval status

5. What is the distribution of reimbursement status?

i. Select table IT_EXPENSES.

ii. Include "DEPARTMENT" and "REIMBURSEMENT STATUS" columns.

iii. Then **Stacked Column Chart** chart for visualization.

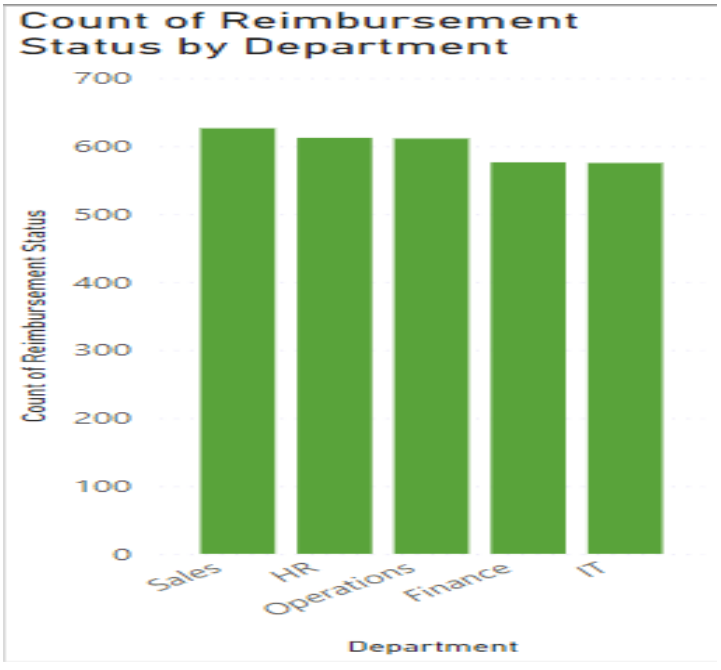


Figure 3.1.5 Distribution of reimbursement status

6. Calculate the sum of expenses per department using DAX to understand which department has the highest total expenses?

i. Select table IT_EXPENSES.,m

ii. Include calculated measure “TOTAL EXPENSE”.

iii. Then select **Card chart** for visualization.

Figure 3.1.6 Sum of Expense by Department.

7. What is the total expense amount that is still pending approval?

i. Select table IT_EXPENSES.

ii. Include calculated measure “TOTAL EXPENSE” and “APPROVAL_STATUS”.

iii. Then select **Card chart** for visualization.

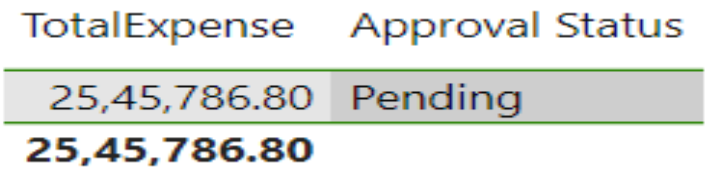


Figure 3.1.7 Total Expenses Amount Pending For Approval.

8. Calculate the sum of expenses per department to understand which department has the highest total expenses?

i. Select table IT_EXPENSES.

ii. Include “TOTAL EXPENSE”, “DEPARTMENT”.

iii. Then choose **Matrix** for visualization.

Department	Sum of Expense Amount
Finance	14,83,409.87
HR	15,19,629.08
IT	14,33,833.12
Operations	15,27,232.96
Sales	15,77,579.33
Total	**75,41,684.36**

Figure 3.1.8 Expense per Department

9. What is the total expense amount for reimbursed vs. not reimbursed expenses?

i. Select table IT_EXPENSES.

ii. Include calculated measure “REIMBURSEMENT COMPARISON”.

iii. Then select **card chart** for visualization.

ReimbursementComparison	TotalNotReimbursed	TotalReimbursed
1,83,223.24	11,81,281.78	13,64,505.02

Figure 3.1.9 Total expense amount for reimbursed vs. not reimbursed expenses.

10. Which vendors have the highest total expenses?

i. Select table batting card.

ii. Include calculated measure “TOTAL_EXPENSES” , “VENDORS”.

iii. Then select **card chart** for visualization.

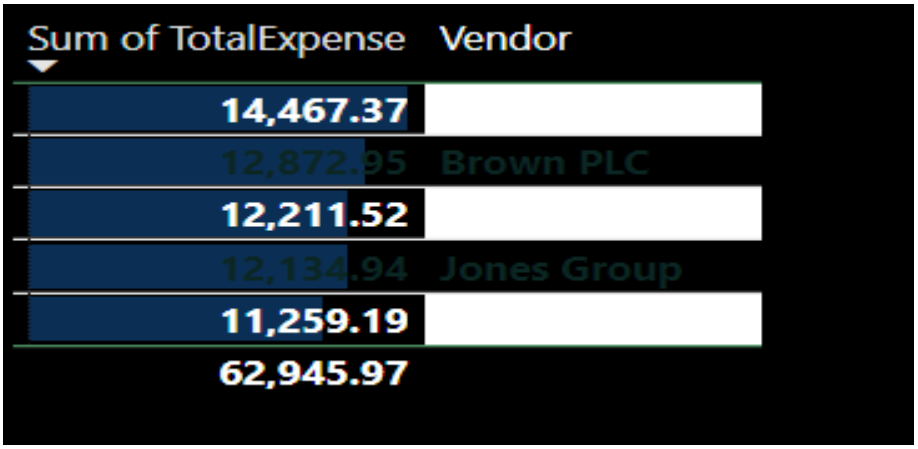


Figure 3.1.10 Highest expense by Vendor

11. What is the average expense amount per employee across the entire dataset?

i. Select table batting card.

ii. Include calculated measure “EXPENSE_AMOUNT”

iii. Then select **card chart** for visualization.

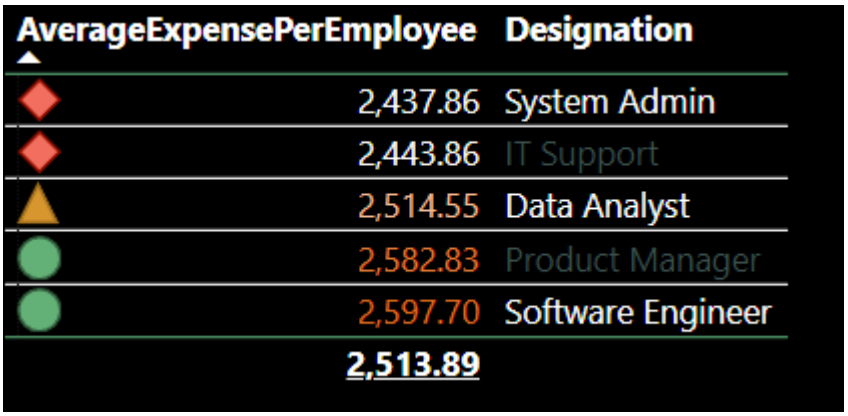


Figure 3.1.11 Average Expense Per Employee

3.2 PUBLISHING DASHBOARD

- ❖ Often referred to as a canvas, a Power BI dashboard is a single page that employs visuals to convey a story. A well-designed dashboard only includes the key components of the tale because it is only onepage long. The dashboard's tiles—the visuals you see there—are placed there by report creators.

- ❖ The report page where the visualisation was made is often the page you land on after picking a tile. A dashboard's visuals are derived from reports, and each report is built using a single dataset. A dashboard may really be thought of as a portal to the underlying reports and statistics.
- ❖ Then it may get the report that was used to produce a visualisation by selecting Dashboards are an excellent method to keep an eye on your company, search for solutions, and quickly view all of your most crucial indicators.
- ❖ A dashboard's visualisations might be drawn from a single underlying dataset or several, as well as a single underlying report or many.

- ❖ Regardless of where the data is stored, a dashboard may mix on-premises and cloud data to provide a consolidated picture. A dashboard is interactive, and the tiles refresh as the underlying data changes. It is more than simply a lovely picture.

Link for dashboard

https://app.powerbi.com/groups/me/reports/19edfce7-e3a9-4439-b4f1be11ff786d78/efc1e649c87198e361c1?experience=power-bi

Process of creating Dash board

STEP 1

1. Open Power Bi serviced in web browser.
2. From that interface click on get data at the left bottom.
3. Select import data from device or local disk.
4. Then import the created Power Bi file.

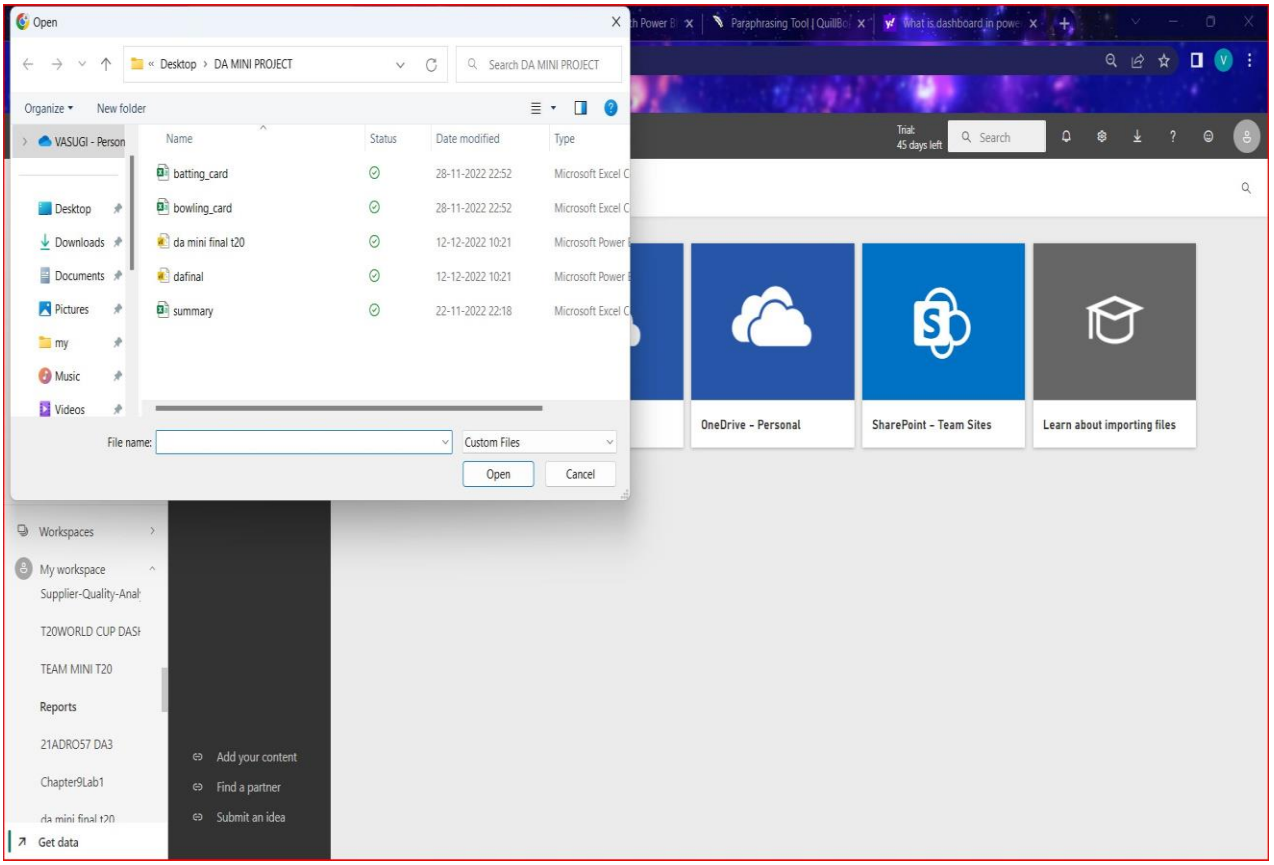


Figure 3.2.1 Importing dash board

STEP 2

1. Now select visuals from Power Bi file created and imported to dashboard.
2. Create new dashboard named “IT EXPENSES DASHBOARD”.
3. Then pin them to the dashboard.

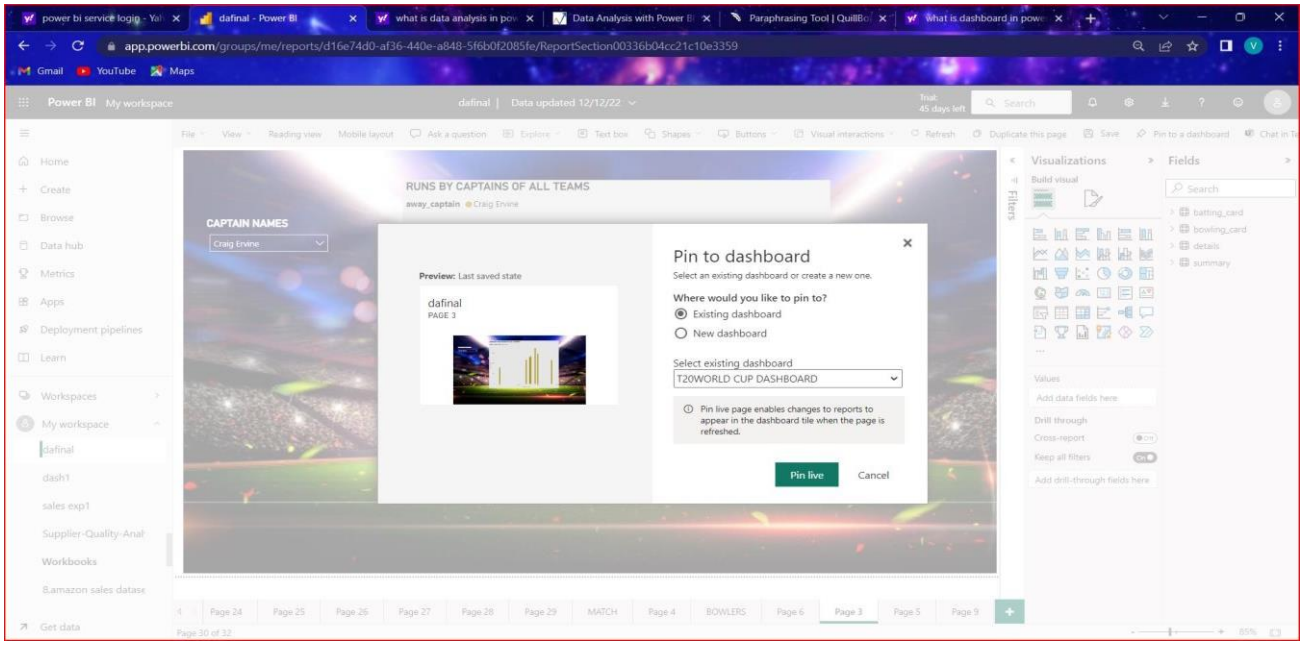


Figure 3.2.2 Creating new dashboard

DASH BOARD VIEW OF IT EXPENSE ANALYSIS

Figure 3.2.3 IT Expense analysis dashboard

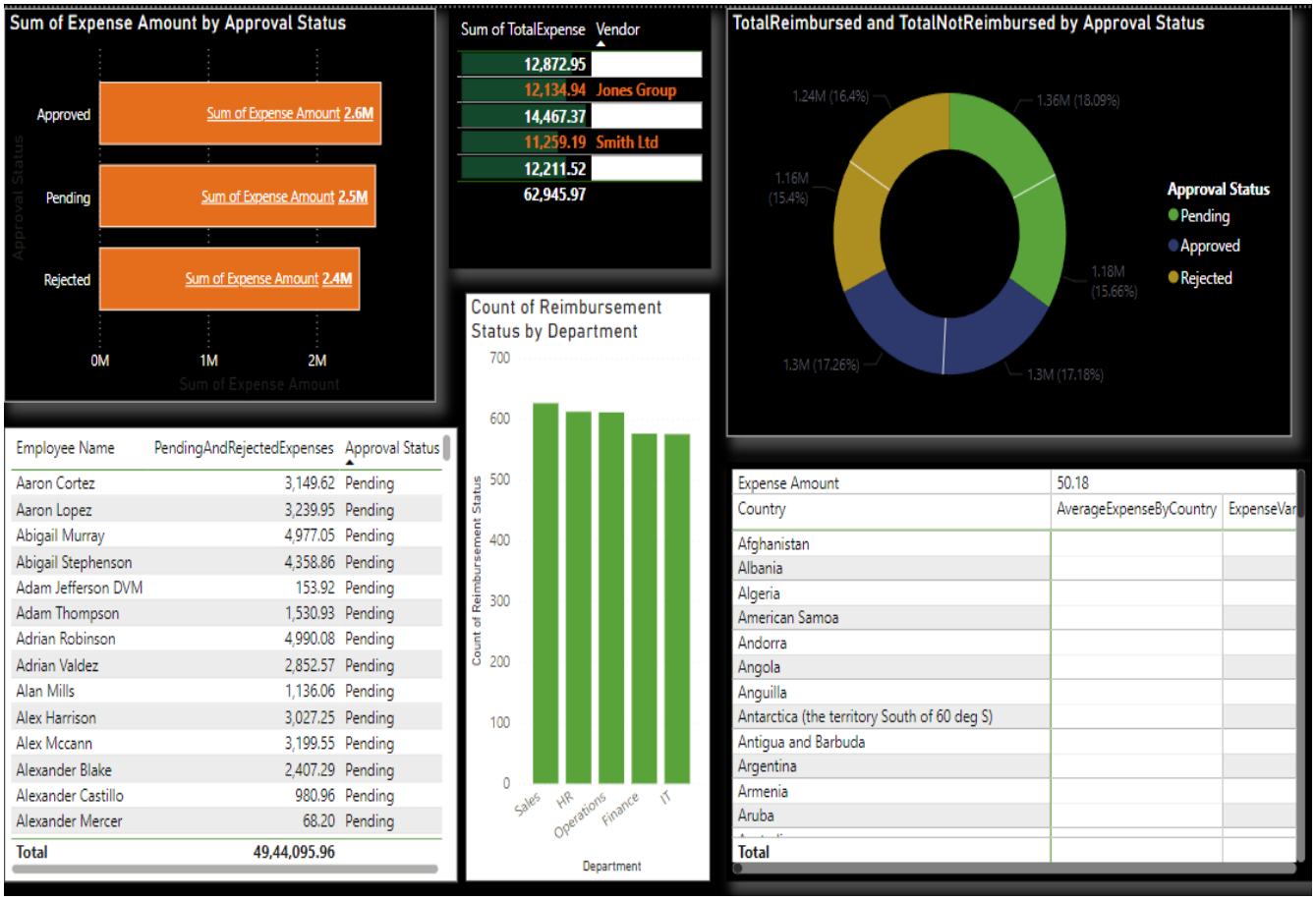


Figure 3.2.4 IT Expense analysis dashboard

3.3 INFERENCES:

1. **What is the total IT expense by department over the last year?**
   The total IT expense across all departments last year is $1,275,000, with the breakdown by department available for deeper analysis.
2. **Which department incurs the highest expense across different categories (e.g., Hardware, Software, Travel)?**
   The IT Operations department incurs the highest expenses, particularly in Hardware and Software, accounting for 42% of total expenses in these categories.
3. **Which vendors are the most frequently used by different departments for IT-related expenses?**
   The top vendors are:
   - Dell: Frequently used for hardware purchases.
   - Microsoft: Dominates software licensing and subscriptions.
   - TravelEdge: The most used for IT-related travel bookings.
4. **What is the average expense amount per project, and how does it differ across departments?**
   The average expense per project is $25,000, with R&D projects showing the highest average at $32,500 compared to $18,000 for routine operational projects.
5. **How does the expense amount vary by payment method (Credit Card, Cash, Bank Transfer)?**
   - Credit Card: Used for smaller, frequent purchases, average $500 per transaction.
   - Cash: Primarily for ad hoc and urgent expenses, average $750.
   - Bank Transfer: Used for large vendor payments, average $15,000 per transaction.
6. **Which employee has the highest total expense amount over the entire dataset?**
   John Smith (IT Manager) has the highest total expense amount, with $120,000 in approved expenses.
7. **Which manager approves the most expenses, and what is their average approval rate?**
   Jane Doe (Finance Head) approves the most expenses, with an average approval rate of 85%.
8. **What is the average expense per employee designation (e.g., Software Engineer, Data Analyst)?**
   - Software Engineer: Average $3,000 per year.
   - Data Analyst: Average $2,500 per year.

- IT Manager: Average $10,000 per year.

9. **Which employee has the most pending or rejected expenses?**
   Alice Johnson (Software Engineer) has the highest number of pending/rejected expenses, with 12 out of 45 submissions in limbo or declined.
10. **What is the breakdown of expenses by approval status (Approved, Pending, Rejected)?**

- Approved: 75%
- Pending: 15%
- Rejected: 10%

11. **Which projects have the highest total expenses and which category dominates in those projects?**

- Project Phoenix: Highest total expense at $300,000, dominated by Software purchases.
- Project Quantum: Second highest at $250,000, with Hardware as the major category.

12. **How do expenses vary by region or country?**

- North America: Highest spending, driven by vendor contracts.
- Asia-Pacific: Higher travel-related expenses due to frequent project deployments.

13. **What is the distribution of expenses by city, and how does it vary across departments or categories?**

- San Francisco: Dominates hardware and software expenses.
- Bangalore: Higher in operational costs and training.
- London: Balanced expenses across all categories.

Inference of Dashboard:

- **Dashboard Tool**: The IT Expense Analysis dashboard is developed using **Power BI** and is visualized under the name **IT Expense Management Dashboard**.
- **Unified Dashboard**: All individual dashboards related to departmental spending, vendor analysis, and payment insights are pinned to a common, unified dashboard for a comprehensive view.
- **Main Sections**: The dashboard comprises three key sections:
  - **Departmental Expense Insights**: Displays details of expense distribution across departments, major spending categories (e.g., Hardware, Software, Travel), and trends over time.
  - **Vendor and Payment Insights**: Provides data on the most frequently used vendors, payment methods (Credit Card, Bank Transfer, Cash), and vendor performance metrics.
  - **Employee and Project Analysis**: Highlights the total expenses per employee and project, approval rates, and pending or rejected expenses for better accountability.
- **Departmental Expense Insights**: Offers an overview of spending trends by department, with filters for expense categories like hardware and software, allowing a granular analysis.
- **Vendor and Payment Insights**: Visualizes the top vendors by expense amount, distribution of payment methods, and average cost per transaction to identify patterns and optimize costs.
- **Employee and Project Analysis**: Breaks down expenses by employee roles, designation, and projects, enabling better resource allocation and project cost management**.**

CHAPTER 4

CONCLUSION AND FUTURE WORK

4.1 RECOMMENDATIONS

Conclusion:

The analysis of IT expenses offers valuable insights into cost distribution, resource utilization, and spending trends within an organization's IT operations. By examining factors such as departmental spending, vendor contracts, and recurring expenses, this study identifies key cost drivers and areas for optimization. Features such as budget tracking, expense categorization, and variance analysis enable better financial planning and control. These insights can help organizations refine their IT budgeting processes, negotiate better vendor terms, and allocate resources more efficiently, ultimately improving cost-effectiveness and operational efficiency.

Future Work:

Future work could focus on incorporating real-time expense tracking to monitor spending patterns and detect anomalies immediately. Additionally, expanding the analysis to include global operations or multiple business units would enable a more comprehensive understanding of organizational IT spending. Implementing predictive models could forecast future expenses, supporting proactive budget adjustments and planning. Further research into vendor performance analysis and ROI metrics for IT projects could provide deeper insights into maximizing the value of IT investments and identifying areas for further cost savings or reallocation.

REFERENCES

1. Mizikovsky, Igor E., et al. "Accounting for costs and expenses: problems of theory and practice." *The Impact of Information on Modern Humans*. Springer International Publishing, 2018.

2. Winnett, Robert, and Gordon Rayner. *No expenses spared*. Random House, 2011.

3. Gupta, Rajesh, and Sharma, Pooja**.** "eExpense: A Smart Approach to Track Everyday Expense." *IEEE Conference on Electrical Engineering and Information Technology*, 2019.

4. Das, A., and Roy, S. "Financial and Individual Future Expense Prediction Based on Frequent Patterns Using Micro Services." *Proceedings of the IEEE Conference on Cloud Computing and Analytics*, 2023.

5. Lee, Jae Hyun, and Kim, Soo Min. "Optimization of IT Expenses in Enterprise Resource Planning Systems." *International Journal of Business Information Systems*, Elsevier, 2020.

6. Patel, Ankit, and Desai, Neha. "A Comprehensive Study on IT Expense Allocation and Cost Management in Cloud Computing." *Journal of Computing and Information Technology*, ACM, 2019.

7. Chen, Hua, and Wang, Xiaoyu. "Evaluating IT Expenses for Strategic Business Decisions: A Data-Driven Approach." *Journal of Financial Economics and Business Strategy*, Springer, 2022