

# POWER BI TRAINING

IBS – PUNE

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August 2024



## Agenda

1. Introduction to Power BI
2. Data Sources supported by Power BI
3. Power BI comparison with other BI Tools
4. Data Visualization in Power BI (Visualization Options)
5. Power BI Data Modelling
6. Dashboard options
7. Excel Integration
8. Sharing Power BI Dashboards
9. Dax Basics in Power BI

(**Note:** This material has been sourced from various resources, mainly from Microsoft Power BI official source. It has been simplified for student consumption and understanding)

# 1.Introduction to Power BI

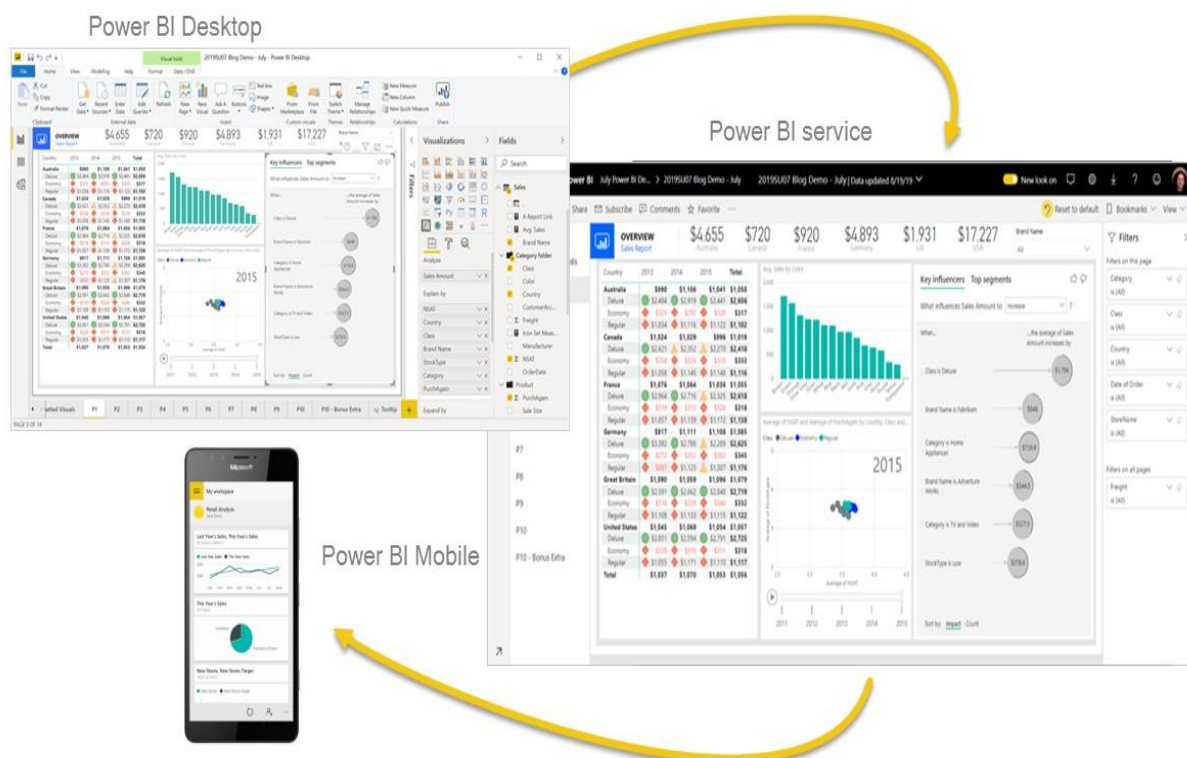
Power BI is a popular business intelligence tool that transforms raw data into compelling, interactive visuals. By connecting to diverse data sources, from simple Excel spreadsheets to complex cloud-based systems, Power BI helps you uncover valuable insights. The insights derived from Power BI can then be easily shared with colleagues or a wider audience.

Power BI is a Microsoft tool that transforms data from various sources into insightful visuals. It empowers businesses to uncover trends, measure performance, and make informed decisions. Seamlessly integrating with other Microsoft products, Power BI offers a comprehensive solution.

The platform comprises three core components:

- **Power BI Desktop:** Is a Microsoft desktop app for data cleaning, transformation, preparation, modeling, and report creation.
- **Power BI Service:** An intuitive and responsive cloud-based service for sharing and collaborating with teams and clients on reports and dashboards.
- **Power BI Mobile Apps:** Mobile applications for accessing insights on the go.

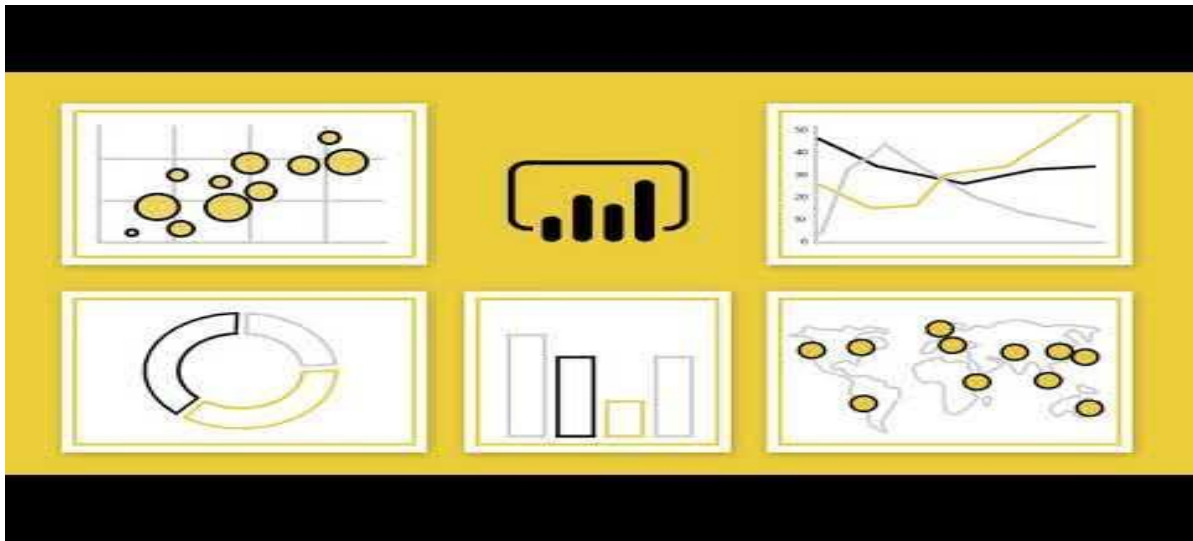
Together, these elements enable users to create, share, and consume business intelligence effectively.



Beyond those three elements Power BI features has two more elements:

Here is a video giving a introduction to Power BI:

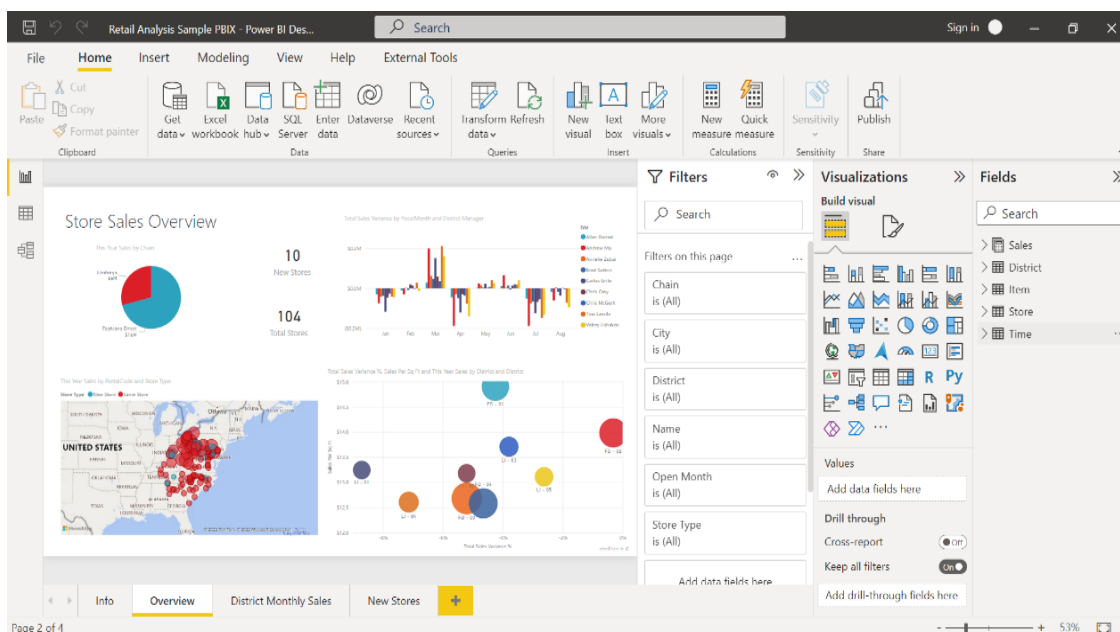
<https://youtu.be/yKTSLfVGBk?si=Z2zBjsWE-dohi1Fk>



## What is Power BI Desktop?

**Power BI Desktop** is a free, downloadable application that allows users to transform raw data into compelling visuals. It serves as the foundation for creating interactive reports. By connecting to various data sources and combining them into a cohesive data model, users can build insightful visualizations.

Once complete, these reports can be shared with colleagues using the Power BI service. Essentially, Power BI Desktop is where the data exploration and report creation magic happen.



## Unveiling the Power of Power BI Desktop

**Power BI Desktop** is your gateway to unlocking insights from your data. This free application empowers you to:

- Connect to diverse data sources: From spreadsheets to cloud databases, Power BI Desktop bridges the gap between your data silos.
- Transform and clean data: Refine your data to ensure accuracy and build a robust foundation for analysis.
- Craft compelling visuals: Create charts, graphs, and other visualizations that bring your data to life.
- Build interactive reports: Assemble collections of visuals on report pages for easy sharing and collaboration.

**These functionalities provide the groundwork for in-depth data exploration.**

**Power BI Desktop offers three key views to navigate your data journey:**

1. **Report View:** This is your primary workspace, where you create reports and visuals, crafting the narrative of your data story.
2. **Table View:** Delve into the underlying data structure. Here, you can view and transform tables, measures, and other elements to optimize your data model for insightful reports.
3. **Model View:** Manage the relationships between tables in your data model, ensuring seamless integration and accurate analysis.

Beyond these core views, Power BI Desktop provides the **DAX Query View** for advanced users. This view allows you to work directly with Data Analysis Expressions (DAX) queries, further enhancing your data manipulation capabilities.

## Sharing Insights with Power BI Service

**Power BI Desktop** focuses on data exploration and report creation. To share your analysis with a broader audience, the Power BI service comes into play. Accessible via your browser at <https://app.powerbi.com>, this Software as a Service (SaaS) offering unlocks collaborative data exploration.

With the Power BI service, users can:

- **Consume and interact with reports:** Dive into reports and individual visuals created in Power BI Desktop, gaining a deeper understanding of the data.
- **Stay informed with dashboards:** Visualize key metrics and trends through interactive dashboards. Each dashboard tile is linked to a report, allowing for deeper investigation upon selection.

The Power BI service bridges the gap between data analysis and actionable insights. By transforming your data into visuals and organizing them into impactful reports and dashboards, Power BI helps you to make data-driven decisions and steer your business towards success.

## Power BI: A Versatile Tool for Data-Driven Success

Power BI is a powerful business intelligence platform transforming raw data into actionable insights. Its core functions include:

### Data Visualization and Reporting

- **Create compelling visuals:** Transform data into charts (bar, line, pie, etc.), maps, and other visual representations to uncover trends and patterns.
- **Build interactive dashboards:** Present key performance indicators (KPIs) and other critical metrics in a single, easy-to-understand view.

#### **Data Integration**

- **Connect to diverse data sources:** Combine data from Excel spreadsheets, databases, cloud-based platforms, and more into a unified view.
- **Transform data for analysis:** Cleanse, shape, and model data to ensure accuracy and consistency.

#### **Business Intelligence**

- **Track performance:** Monitor key performance indicators (KPIs) in real-time to measure progress against goals.
- **Predict future trends:** Leverage built-in AI and machine learning capabilities to forecast outcomes based on historical data.

#### **Collaboration and Sharing**

- **Foster data-driven culture:** Share insights and reports across the organization to promote informed decision-making.
- **Enable teamwork:** Collaborate on shared datasets and workspaces to streamline processes.

#### **Industry-Specific Applications**

- **Financial analysis:** Create financial reports, analyze sales performance, and track profitability.
- **Marketing and sales:** Understand customer behavior, measure campaign effectiveness, and optimize sales strategies.

Power BI's user-friendly interface makes data analysis accessible from data analysts to business leaders. By harnessing the power of data, organizations can make real-time decisions, improve efficiency in operations, generate value, and drive growth.

## **USAGE OF POWER BI**

What is Power BI used for?

#### **Data visualization and reporting**

- Create reports and dashboards that present data sets in multiple ways using visuals.
- Turn data into a wide range of different visuals, including pie charts, decomposition trees, gauge charts, KPIs, combo charts, bar and column charts, and ribbon charts—among many other options.

#### **Data integration**

- Connect various data sources, such as Excel sheets, onsite [data warehouses](#), and cloud-based data storage, and then transform them into business insights.
- Integrate Power BI with a website.

#### **Business intelligence**

- Track key performance indicators (KPIs) and metrics in real time.
- Use built-in AI and machine learning to make business predictions based on historical data.

### **Collaboration and sharing**

- Provide company-wide access to data, data visualization tools, and insights to create a data-driven work culture.
- Collaborate on workspaces and shared datasets.

### **Financial analysis**

- Create financial statements and balance sheets.
- Analyse sales performance and profit.

### **Marketing and sales**

- Integrate Power BI with a [CRM](#) system to analyse customer data and use insights to improve customer experience.
- Analyse market trends and consumer behaviour to discover opportunities.

Power BI is designed to be user-friendly, making advanced data analytics accessible to both technical and non-technical users.

## **2.Data Sources supported by Power BI**

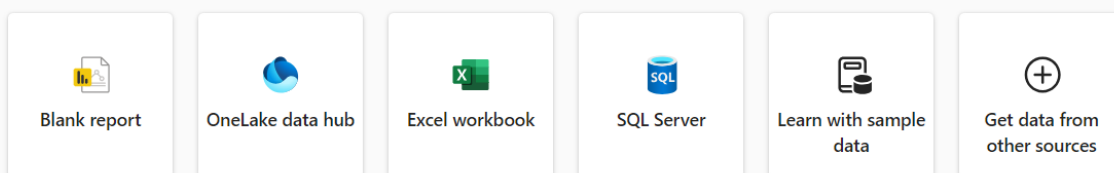
### **Power BI: A Versatile Platform for Data Analysis**

Power BI is a powerful tool, and its main power lies in its ability to connect to and analyse a vast array of data sources. Today's organizations operate in a complex, data-rich environment, necessitating a versatile tool like Power BI to unify disparate information.

Power BI empowers users to perform in-depth analysis, uncover hidden patterns, and make data-driven decisions by integrating data from various sources. This flexibility, with user-friendly interfaces and advanced analytics capabilities, makes Power BI a preferred choice for businesses of all sizes.

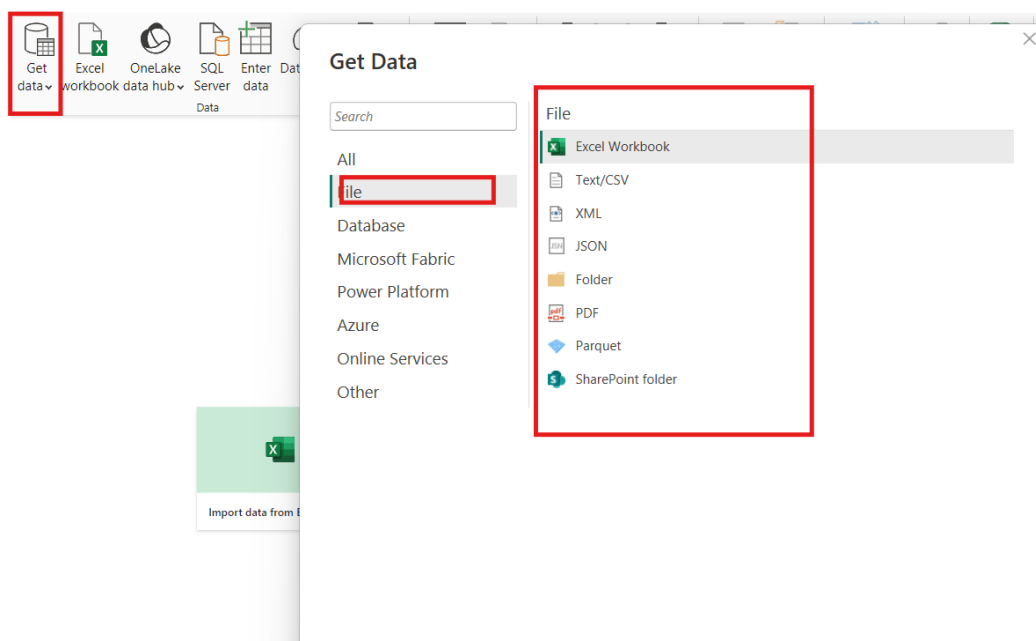
Let's explore the diverse data sources supported by Power BI:

▼ Select a data source or start with a blank report



## File Sources:

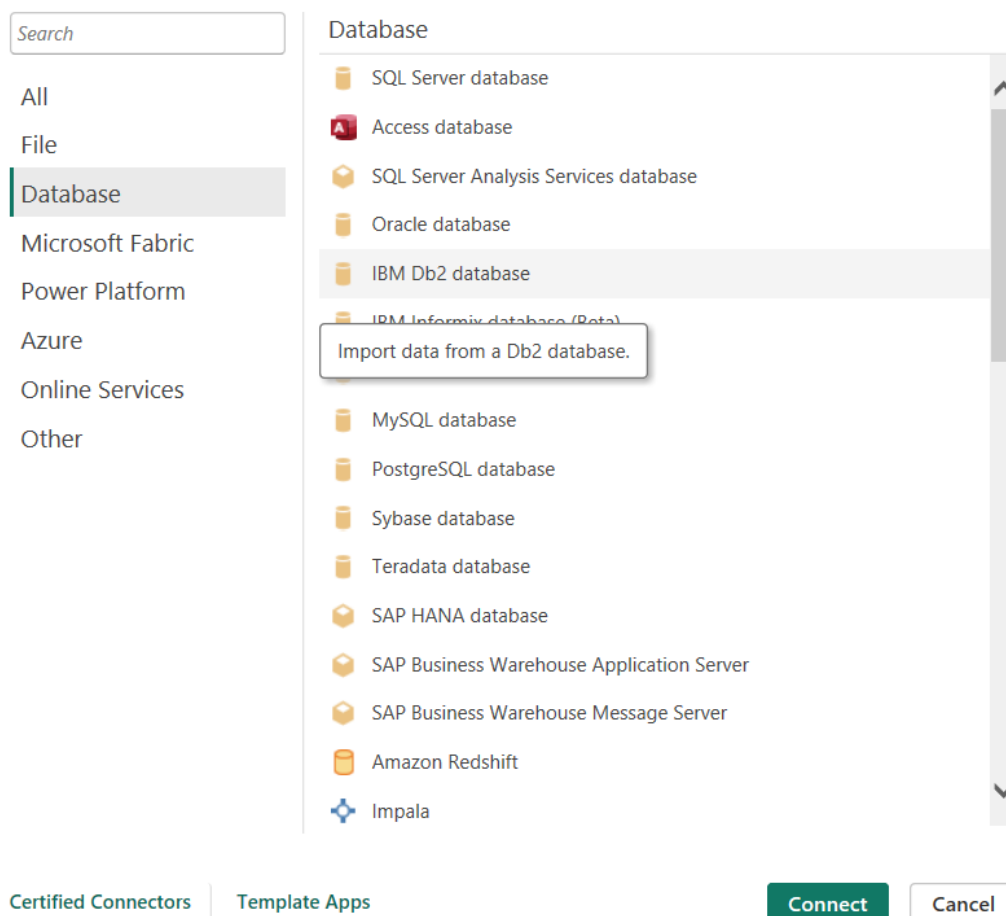
- Excel: .xlsx, .xlsm
- Text/CSV: .txt, .csv
- XML: .xml
- JSON: .json
- Folder: Connect to files within a folder.
- PDF: .pdf
- Parquet: parquet
- SharePoint Folder: Connect to files within a SharePoint folder.



## Database Sources

- SQL Server: SQL Server databases.
- Oracle: Oracle databases.
- MySQL: MySQL databases.
- PostgreSQL: PostgreSQL databases.

- IBM Db2: IBM Db2 databases.
- SAP HANA: SAP HANA databases.
- SAP BW: SAP Business Warehouse.
- Snowflake: Snowflake cloud data platform.
- Amazon Redshift: Amazon Redshift data warehouse.
- Google Big Query: Google Big Query data warehouse.
- Azure SQL Database: Azure SQL databases.
- Azure Data Lake Storage: Data stored in Azure Data Lake.
- Azure Synapse Analytics: Azure Synapse Analytics.
- Databricks: Databricks databases.
- Teradata: Teradata databases.

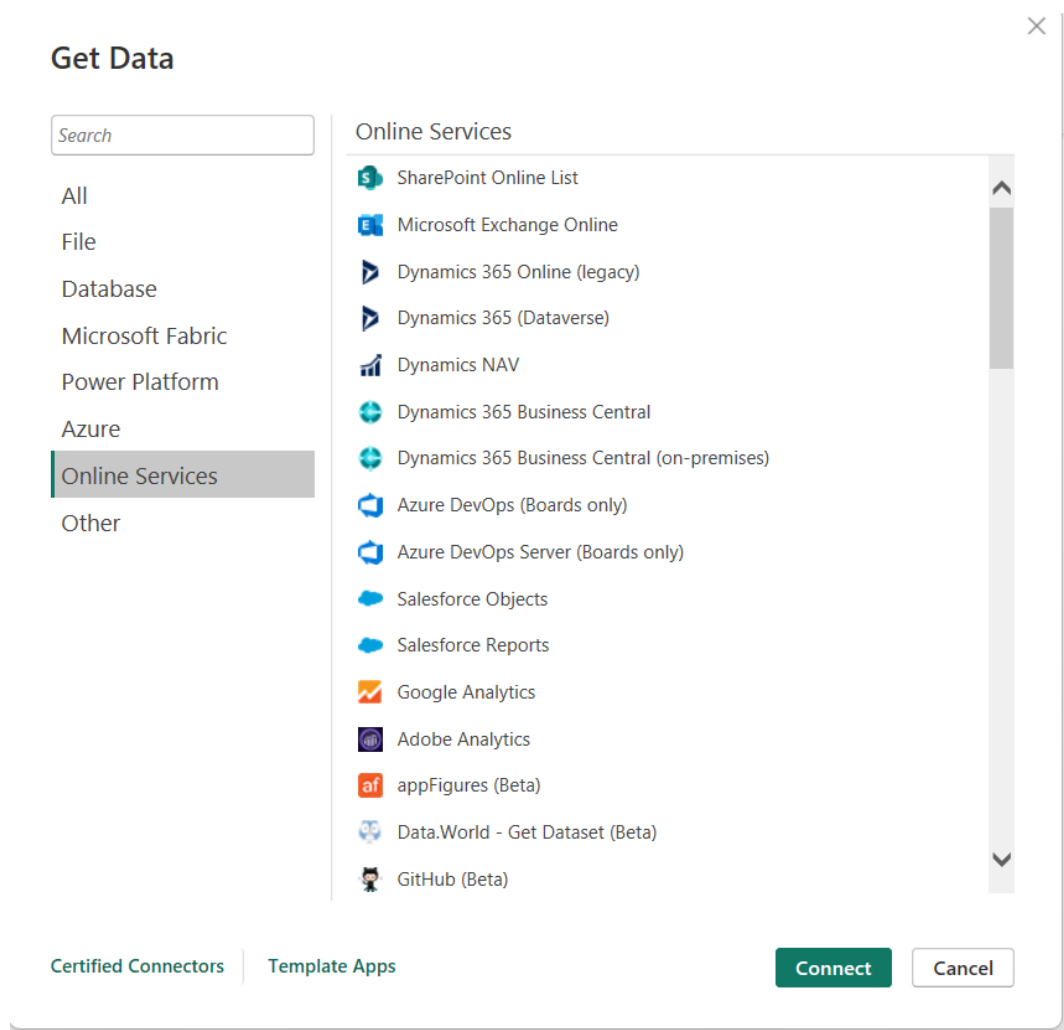


### Online Services:

- Azure Analysis Services: Azure Analysis Services databases.



- Azure DevOps: Data from Azure DevOps services.
- Dynamics 365: Data from Dynamics 365 applications.
- Google Analytics: Web analytics data from Google Analytics.
- Salesforce: Data from Salesforce CRM.
- Microsoft Exchange: Data from Microsoft Exchange server.
- GitHub: Data from GitHub repositories.
- Facebook: Data from Facebook.
- QuickBooks Online: Data from QuickBooks Online.
- Smartsheet: Data from Smartsheet services.
- Zendesk: Data from Zendesk services.



## Other Data Sources

- Web: Data from web pages.
- OData Feed: OData feeds.
- R Script: Data from R scripts.
- Python Script: Data from Python scripts.
- Blank Query: Manually enter data or use custom queries.

## Getting Different Types of Data in Power BI

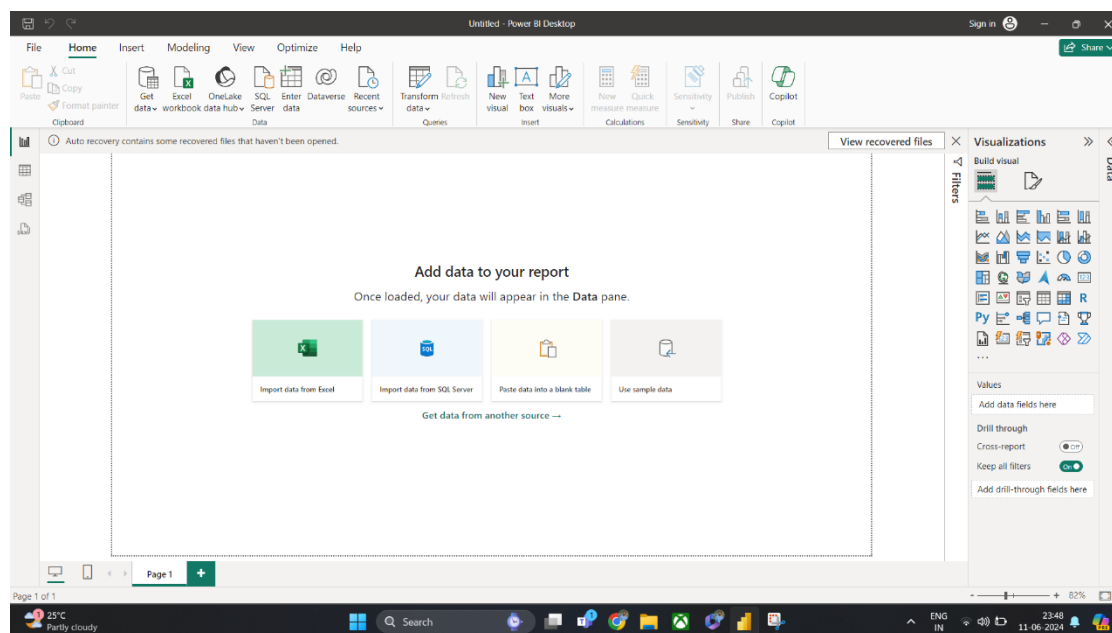
<https://learn.microsoft.com/en-us/power-bi/connect-data/service-get-data>

Integrating different data sources into Power BI enhances the ability to conduct thorough and accurate analyses, leading to better business insights and more strategic decision-making. It enables companies and business houses to leverage their data assets fully, creating a competitive advantage and driving business success.

To get data into Power BI, you follow a series of steps to connect to your data source, load the data, and optionally transform it.

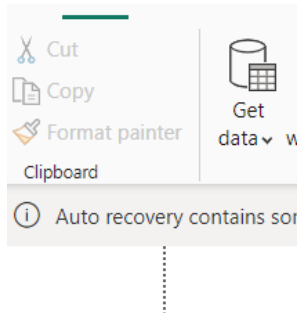
Here's a detailed guide to help you through the process:

### Step 1 Open Power BI Desktop:



## Step 2:

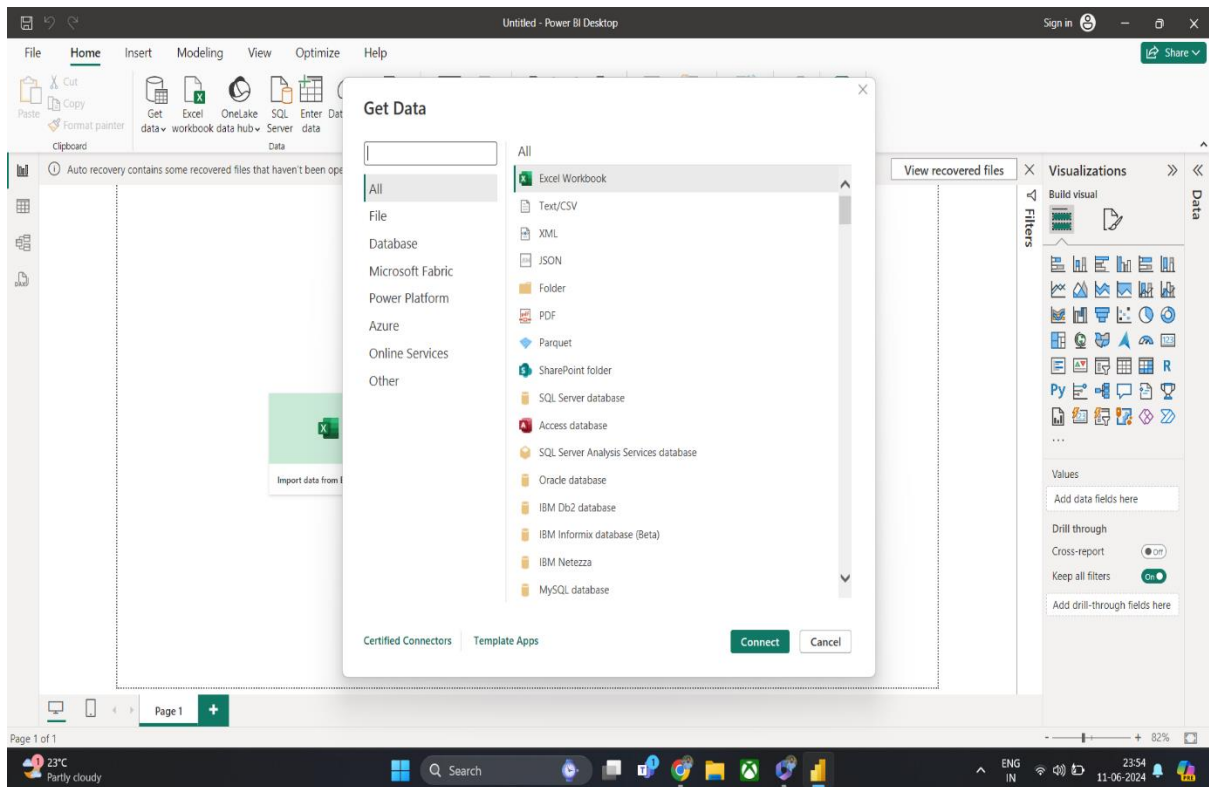
- **Home Tab:** Click on the "Home" tab in the ribbon at the top of the screen.
- **Get Data:** Click the "Get Data" button. A dropdown menu will appear with various data options.



## Step 3: Choose data Source

You will see a window listing the various data source options categorized by type. Common categories include:

- **File:** Excel, CSV, XML, JSON, PDF, etc.
- **Database:** SQL Server, Access, Oracle, MySQL, PostgreSQL, etc.
- **Power Platform:** Power BI datasets, Power BI dataflows, etc.
- **Azure:** Azure SQL Database, Azure Blob Storage, Azure Table Storage, etc.
- **Online Services:** SharePoint Online, Dynamics 365, Google Analytics, etc.
- **Other:** Web, OData feed, Hadoop, Active Directory, etc.

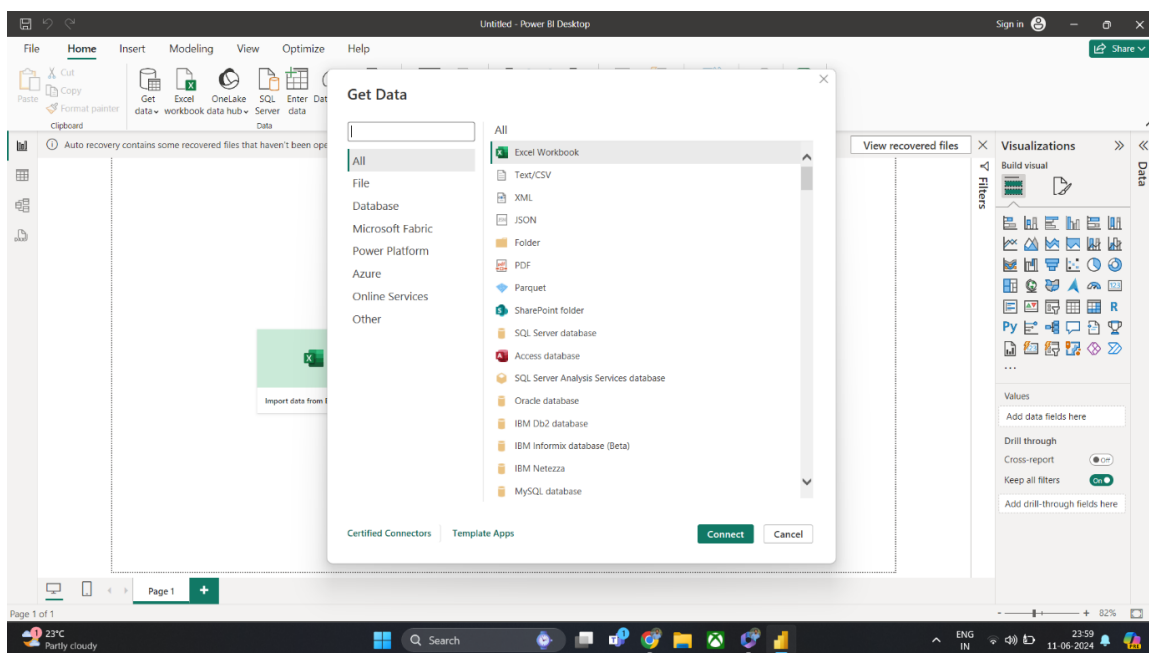


#### Step 4: Connect your data source.

- **Select Data Source:** Click on the specific data source you want to connect to.

For example, if you're using an Excel file, select "Excel".

- **Browse:** A file dialog will appear. Browse to the location of your file, select it, and click "Open".



When you click on connect then browse option will come so you have to browse location whichever file you want to upload on Power BI and click 'open'.

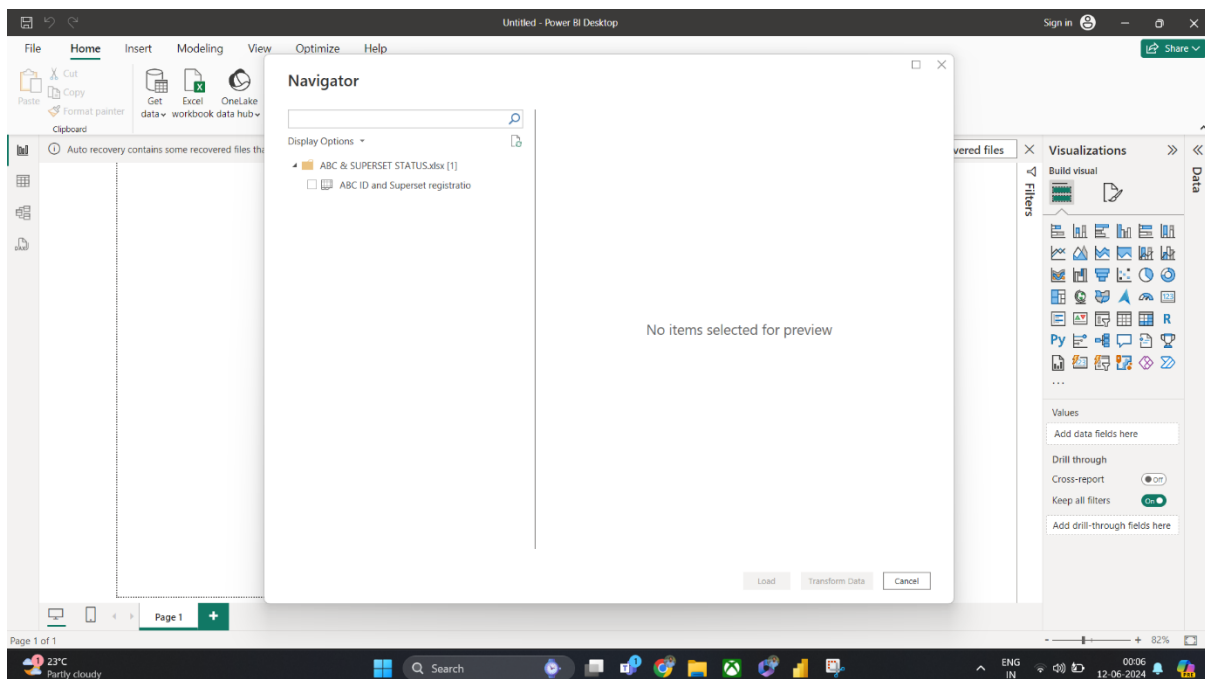
## Step 5: Load or Transform Data

1. **Navigator Window:** The Navigator window will appear, showing the available tables or sheets in your file.

- **Select Tables/Sheets:** Check the boxes next to the tables or sheets you want to import.
- **Preview:** You can preview the data to ensure you're selecting the correct tables or sheets.

2. **Load or Transform:**

- **Load:** Click "Load" to directly load the data into Power BI.
- **Transform Data:** Click "Transform Data" to open the Power Query Editor if you need to clean or transform the data before loading.



Like here I have selected a ABC excel file, after selecting a preview will be shown and then you can click on "Transform Data" to load the data in Power BI.

This is how different data can be uploaded on Power BI.

Here is link of tutorial showing the same steps to go through:

<https://youtu.be/PXqFXG4rzXE?si=Lx-ug-0p03t3Twc7>

# 3.Comparison of Power BI with other BI tools

## Power BI: Standing Out in the BI Landscape

The business intelligence (BI) market is brimming with tools, each with its strengths. However, Power BI has carved a unique niche for itself, attracting users with its powerful combination of features. Let's delve into what sets Power BI apart:

### Designed for the Modern User:

- **Self-Service BI:** Unlike traditional BI tools that rely heavily on IT departments, Power BI empowers employees in corporate houses to explore data and gain insights independently.
- **Data Modeling Prowess:** Power BI goes beyond just reporting. It provides robust data modeling capabilities, ensuring data is organized and structured for accurate analysis.

### Comprehensive Capabilities:

- **Three Layers, One Tool:** While most BI solutions focus solely on the reporting layer, Power BI manages all three: raw data, semantic model (data organization), and reports.
- **Powerful Features:** Power Query simplifies data transformation, the robust modeling environment facilitates complex calculations, and DAX offers advanced data manipulation.
- **Multilingual Power:** Mastering M, DAX, and reporting features unlocks the full potential of Power BI, equipping users for comprehensive BI tasks.

### Tailored for Business Needs:

- **Microsoft Integration:** Power BI seamlessly integrates with other Microsoft products like Excel, Azure, and SQL Server, making it a perfect fit for organizations already invested in the Microsoft ecosystem.
- **Cost-Effective Advantage:** Especially for small and medium businesses, Power BI proves to be a cost-effective solution for data analysis.
- **User-Friendly Interface:** Renowned for its intuitive interface, Power BI lowers the barrier to entry for exploring data.

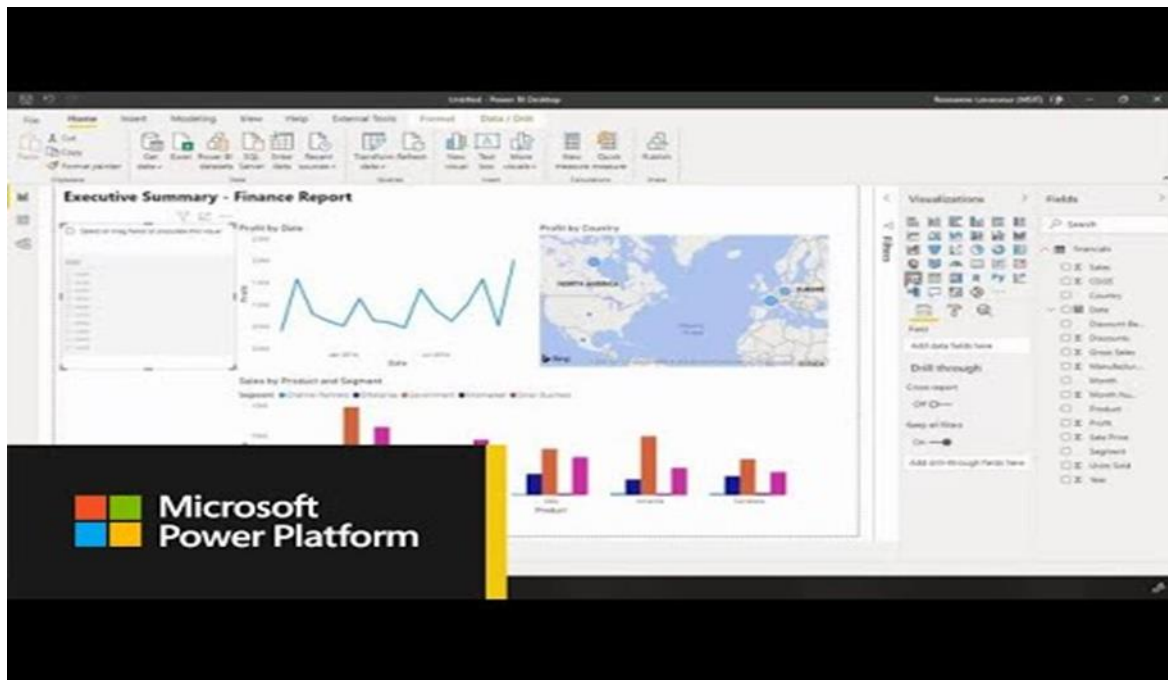
### Beyond the Basics:

- **Data Exploration:** While Power BI excels in reporting and visualization, other tools like Qlik may hold an edge in pure data exploration.
- **Customization and Extensibility:** Tailor dashboards to specific needs with custom visuals, providing users with greater flexibility.
- **Real-Time Insights:** Power BI supports real-time data streaming and dashboard updates, allowing for crucial monitoring of live data.

#### **Collaboration and Growth:**

- **Seamless Teamwork:** Integration with Microsoft Teams and SharePoint fosters better collaboration, making data insights readily available to teams.
- **Secure Sharing:** Share reports and dashboards with access control and data governance options, ensuring data security.
- **AI and Advanced Analytics:** This allows you to leverage Text Processing, Data Science, and ML capabilities to gain deeper insights from data.
- **Active Community:** Benefit from a large and active user community with forums, shared knowledge, and third-party resources.
- **Regular Updates:** Backed by Microsoft's extensive support network, Power BI receives frequent updates and improvements.
- **Deployment Options:** Choose from a cloud-based solution or on-premises deployment with Power BI Report Server, catering to diverse needs.

These unique features contribute to Power BI's popularity across a wide range of businesses, making it a valuable tool for extracting insights, driving data-driven decisions, and empowering users of all skill levels.



## 4.Data Visualization in Power BI

### Power BI Charts: Visualizing Your Data

Power BI offers a rich palette of chart types to transform raw data into meaningful insights. By visualizing data, you can uncover trends, patterns, and anomalies that might be hidden in spreadsheets.

#### Basic Chart Types

- **Bar Charts and Column Charts:** Both these basic charts are perfect for comparing categorical data. Bar charts are horizontal, while column charts are vertical.
- **Line Charts:** Ideal for visualizing trends over time, displaying continuous data points connected by lines.
- **Pie Charts and Donut Charts:** Effectively show the composition of a whole, with pie charts dividing a circle into sectors and donut charts adding a central hole.
- **Area Charts:** Similar to line charts, they work slightly differently as they also encompass the area beneath the line chart. This serves to emphasize the magnitude of change over time.
- **Stacked Charts:** Break down data into categories within a single bar or column, allowing comparison of totals and individual components.



- **100% Stacked Charts:** Show the proportion of each category within the total, useful for comparing relative contributions.
- **Scatter Charts:** Display relationships between two numerical variables, helping identify correlations or patterns.
- **Funnel Charts:** Visualize stages in a process which are ideal for analyzing conversion rates or customer journeys.
- **Waterfall Charts:** Show the cumulative effect of positive and negative values commonly used in financial analysis.
- **Ribbon Charts:** Illustrate the flow of data between categories over time, revealing shifts and trends.

By strategically selecting chart types, you can create compelling visualizations that effectively communicate your data story.

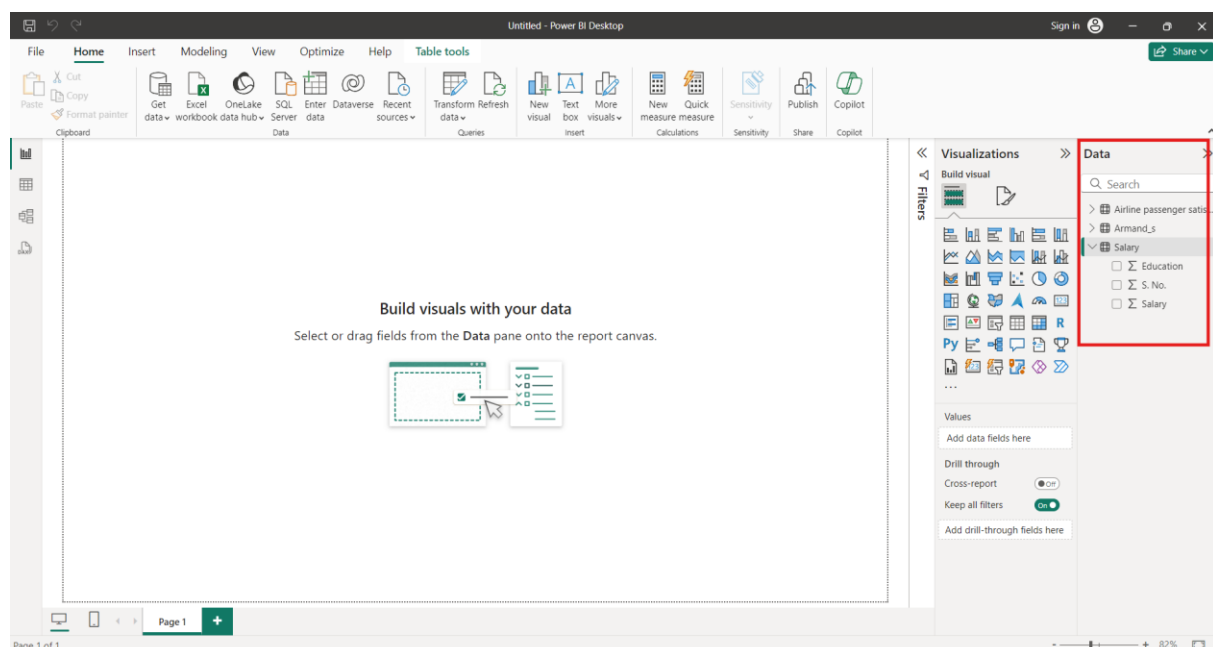
Let's see some examples of Charts that we can Create in Power Using excel file.

### Step 1: Open Power BI Desktop

**Step 2: Click on “Get data” and then Click on Files you want to get on Power BI.**

### Step 3: Load data in Power BI

Here I am getting some excel files which I want to visualize on Power BI.

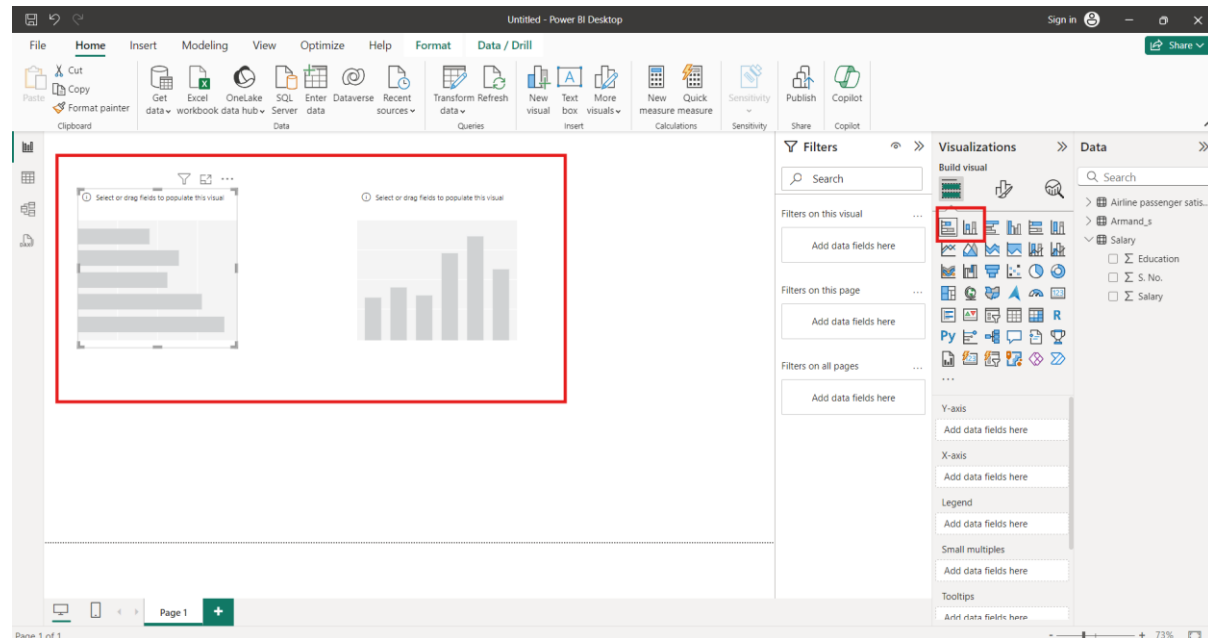


After uploading data files in Power as you can on right side your data files will appear , I have uploaded three excel files which I want to visualize here.

Other than the data option you can also see the visualization option in which various types of charts and options given to visualize.

#### **Step 4: Select chart in which you want to visualize your data.**

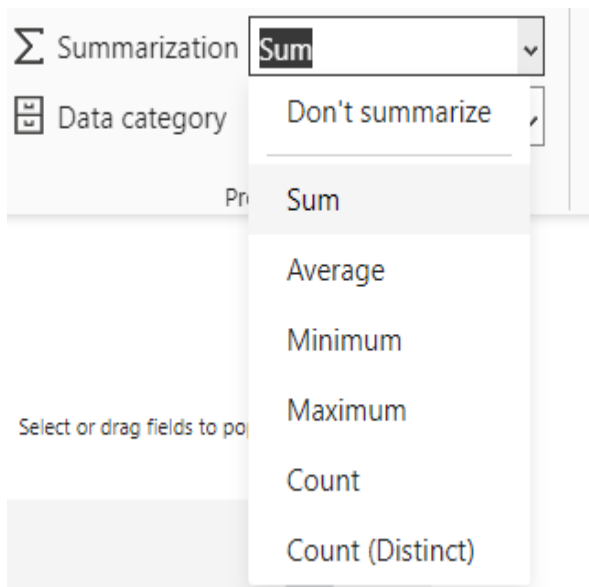
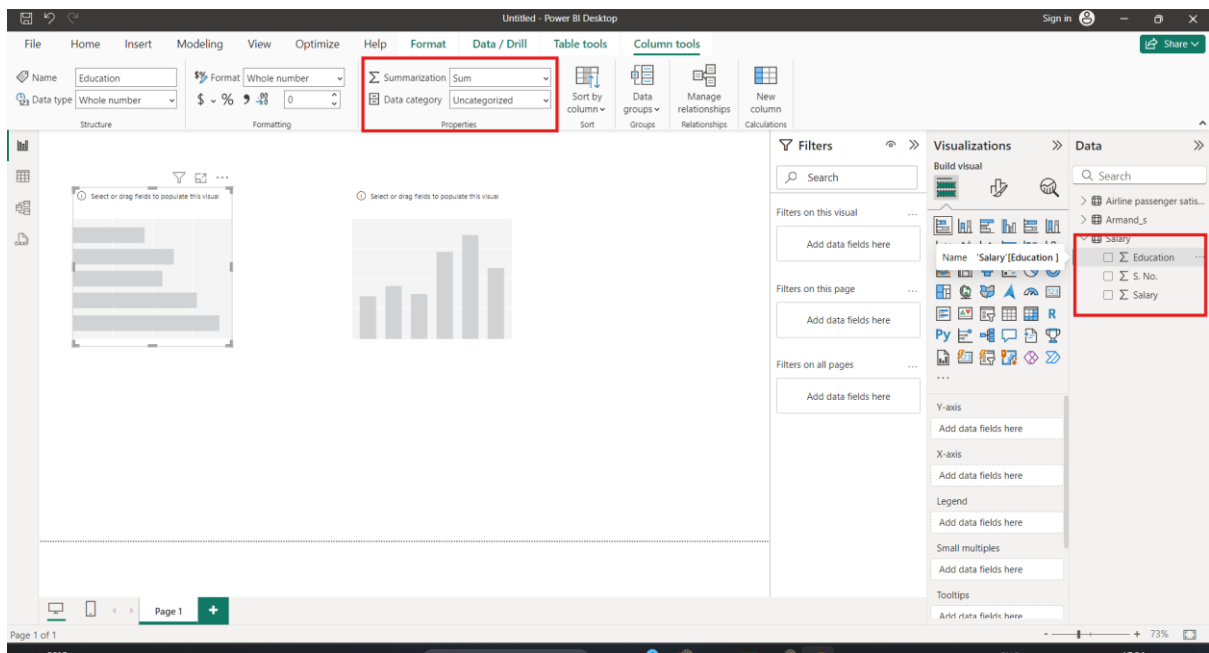
As you can see, I have selected two charts stacked bar graph and stacked column data to visualize.



Now you can select the chart by clicking on it and then click on data check boxes whichever data you want to visualize or compare.

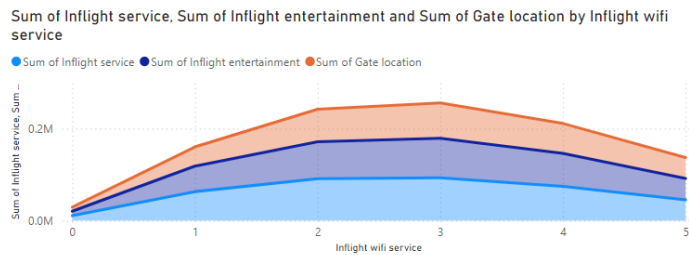
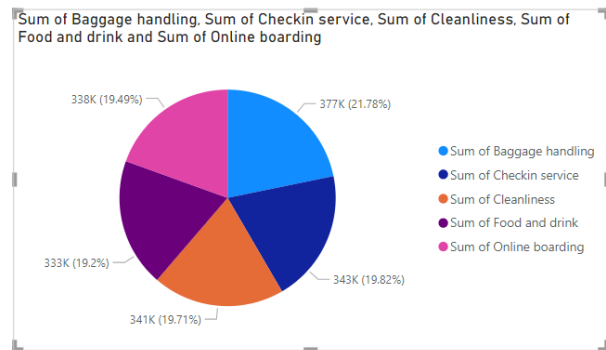
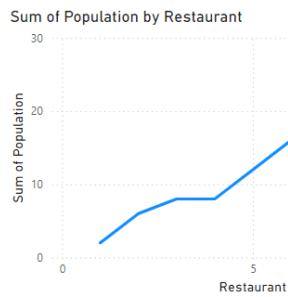
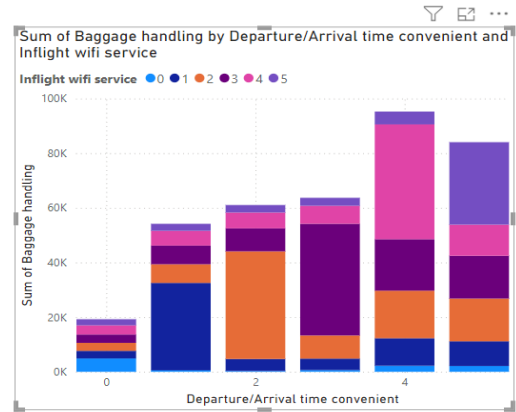
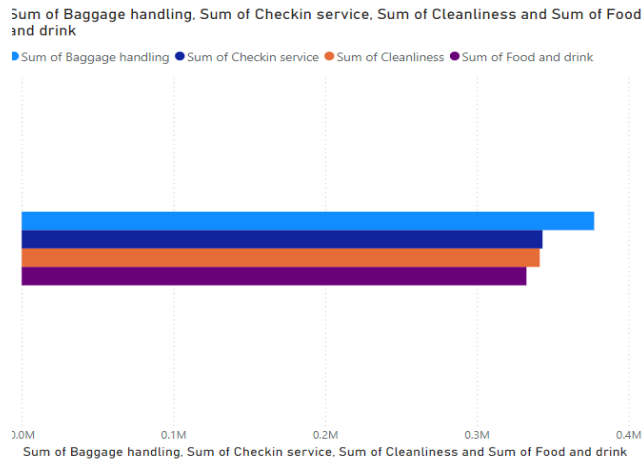
Here on right side in image you can see data is given in summation form as it is default in my desktop, we can change this summation form to 'Don't summarize or Average, Minimum, Maximum or Count' as shown in the following image.

Firstly, you must click on data that you want to change, suppose here I don't want to summarize 'population' and 'Salary' then you will get a 'column tool' option there you can see 'Summarization' and 'Categorization' option then you can select from there.



## Step 5: Visualize Data.

These are some charts that I have visualized using Power BI



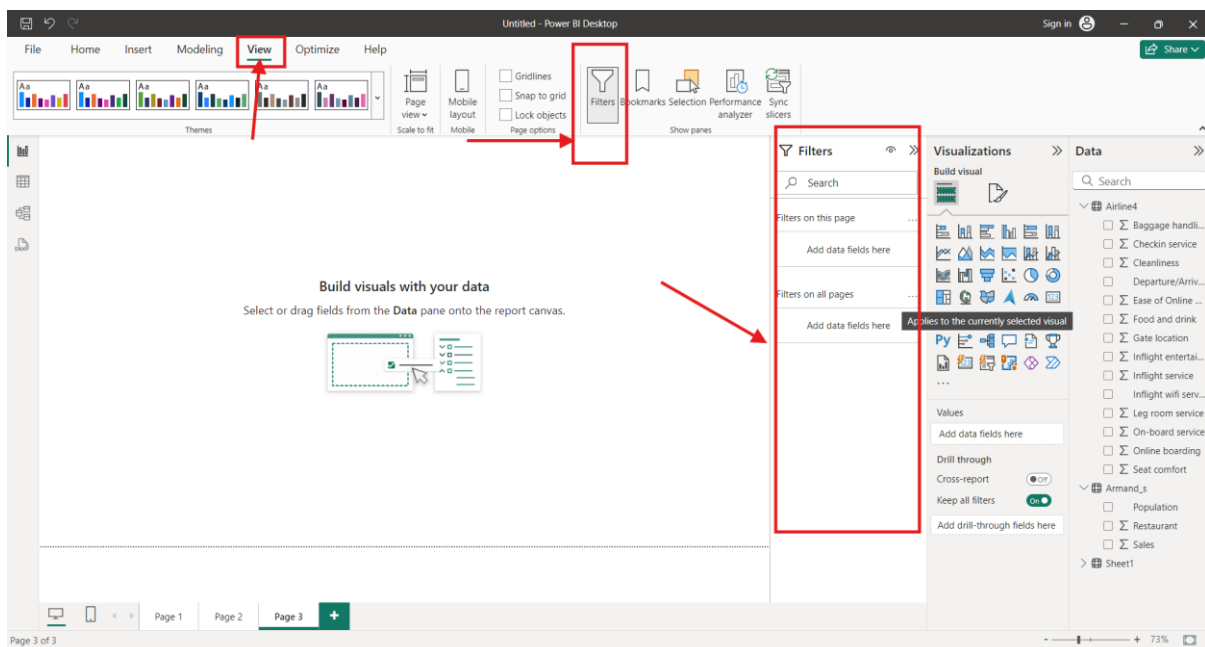
Here is video you should go through:

<https://youtu.be/s7RxDAm4TP0?si=xmsz7hYrN0GI3AIN>



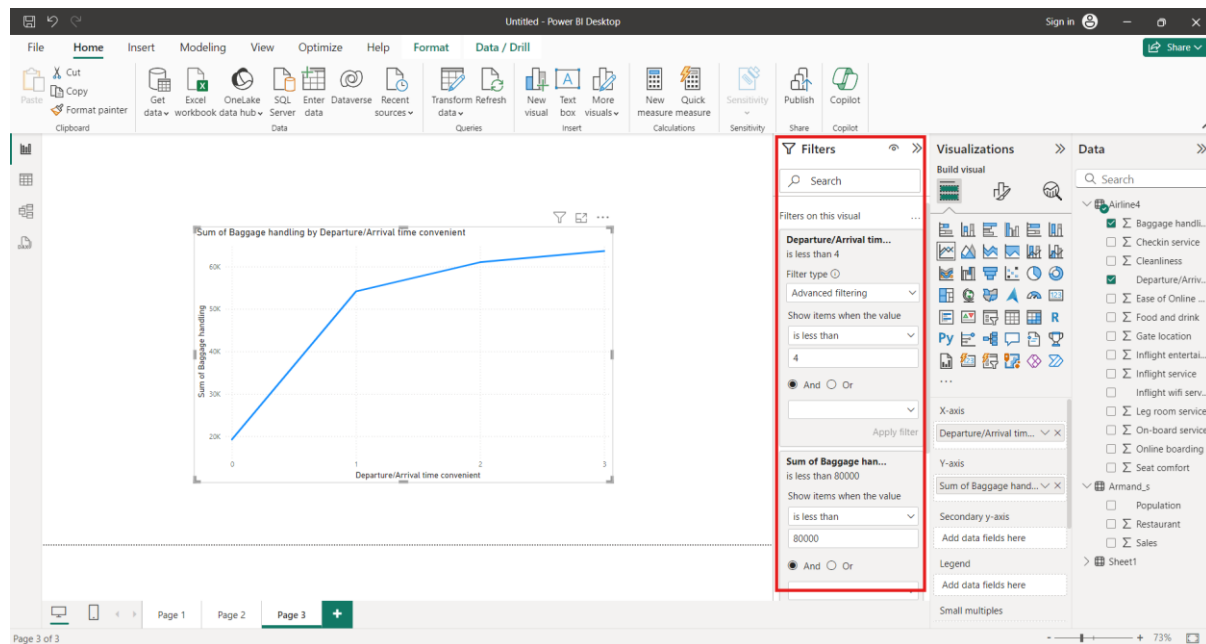
**Step 6: Filtering** can be done to visualize data as per your requirement.

On the Power BI desktop Click on 'View' tab there you can see option of 'Filter' by clicking on you will get filter add in on right side of desktop.



In the filter option you can customize your data by applying different filters so that only that data will be visualized accordingly.

Let's see an example how filter works:



Here I have visualized relation between Sum of baggage handling and departure /arrival time convenient using a line graph and I have applied filter where: departure < 4 and sum of baggage < 80000, the line graph will show exact data as filtered, as you can see in the above image.

This is how filter function works, and you can filter and customize your visuals as per your requirement.

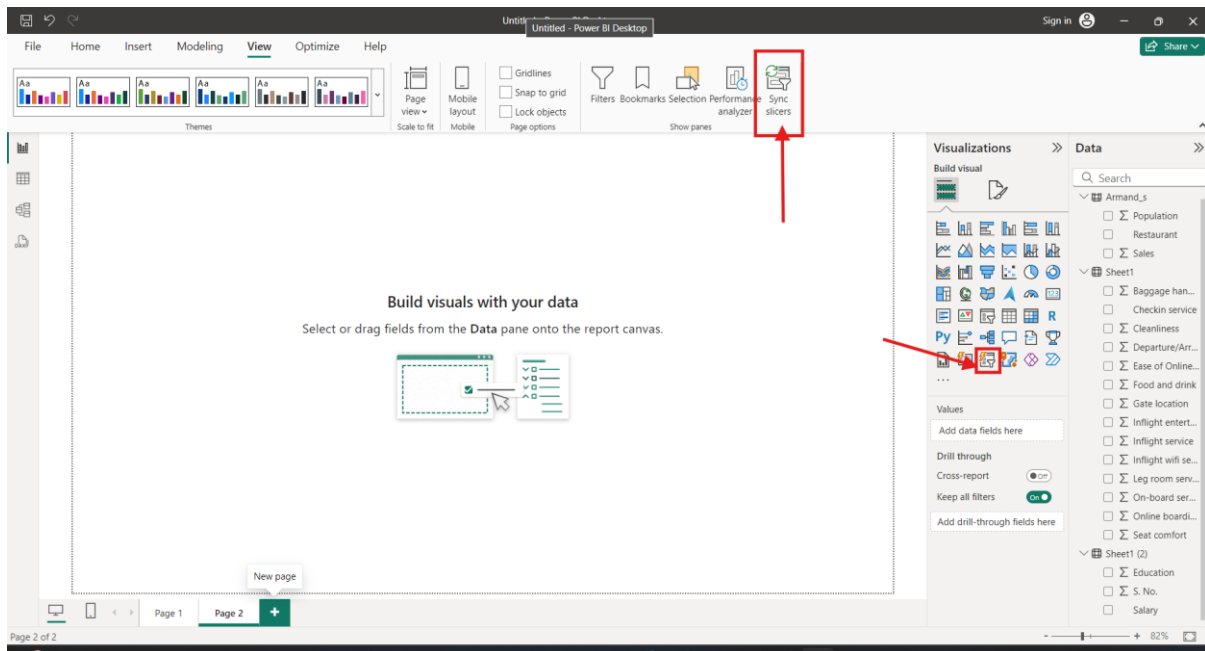
There are two options advanced filtering and basic filtering you can use any of them as per your convenience and requirement.

## Step 7: Using Slicers

Slicers in Power BI used to interactively filter and explore your data. Slicers are visual filter controls that allow you to segment and filter data in your reports and dashboards.

Here is how you can use slicers:

Navigate to Visualizations on right side and select 'Slicer'. And in the 'View' tab there is a sync slicer option if you want to use consistent slicer with multiple pages.



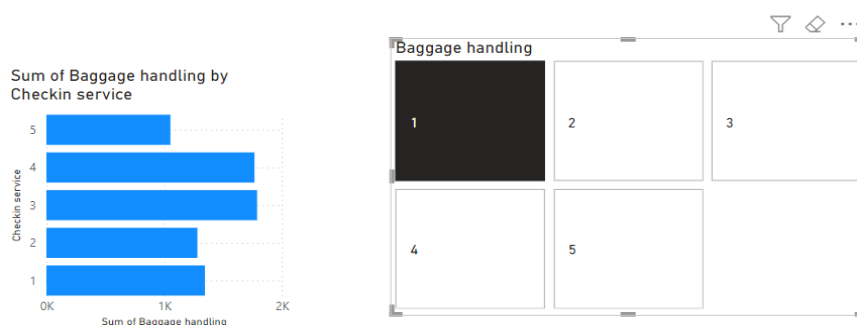
Let's take an example here I have visualised bar graph showing relation between 'check-in service' and 'sum of baggage handling'.

And then I added slicer and chose baggage handling to slicer now if choose 1 baggage handling in slicer then the corresponding graph will show exactly same data that 1 baggage handling occurred at check-in service.

This is how you can slicers easily to filter the required data.

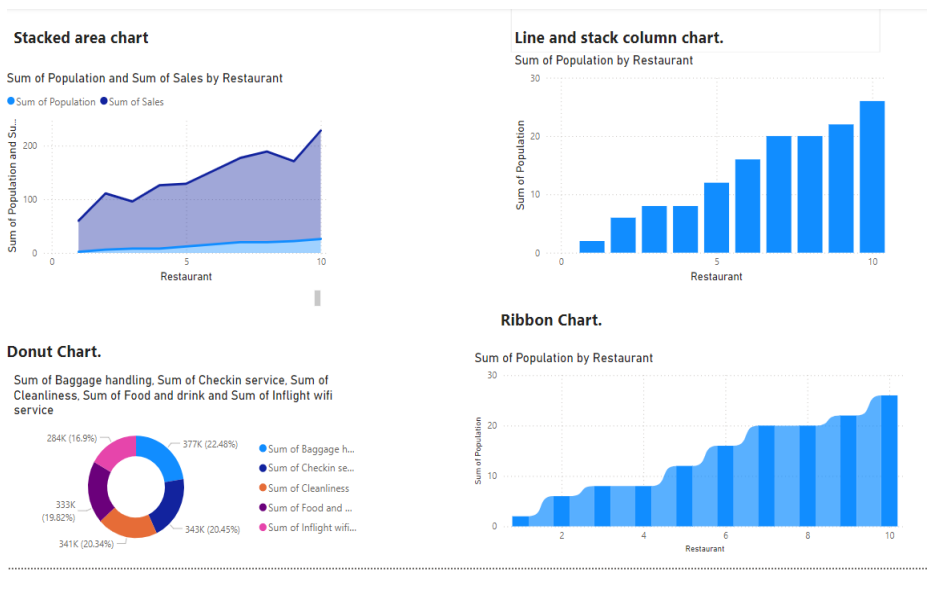
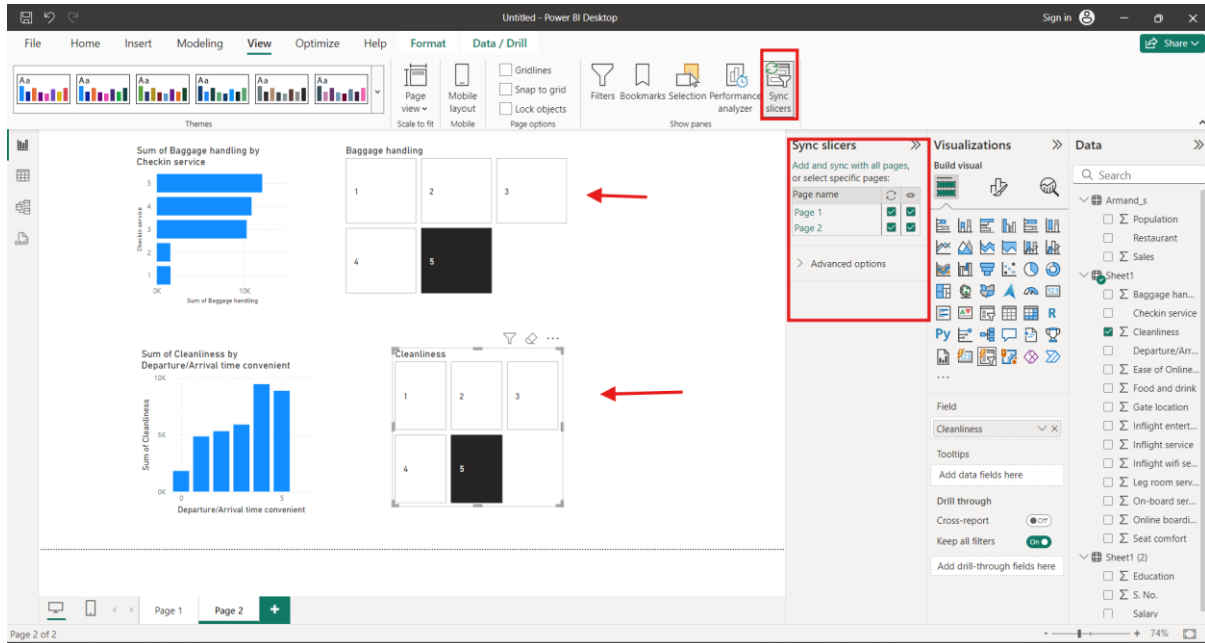
So, the question here comes is that what is difference between Filters and Slicers, the main difference between is that Filters used to control what data is included in visuals, pages, or the entire report. Less interactive for end-users whereas Slicers designed for end-users to interactively filter data directly on the report page.

The below image shows the demonstrated example of slicer.



## Sync Slicers

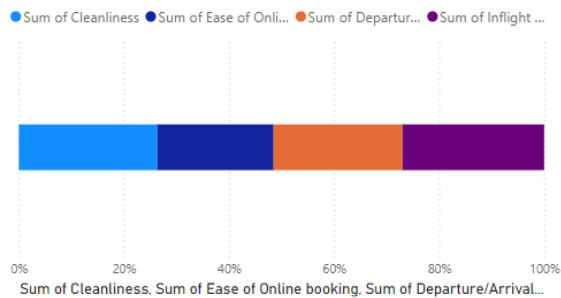
Here I have made another Bar graph showing relation between 'Cleanliness' and 'Departure/Arrival time' and used slicer for this graph as well. Then I used sync slicers option so it has synced both the data, so if you select any of slicer then visuals will change in both the graph as per filtration.





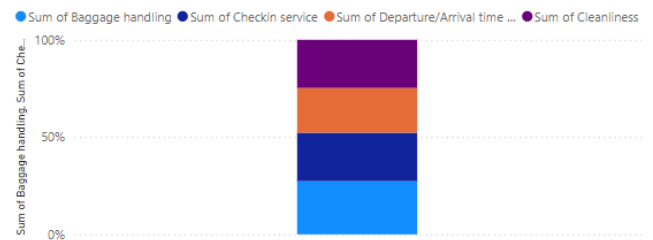
**100% stacked bar chart**

Sum of Cleanliness, Sum of Ease of Online booking, Sum of Departure/Arrival time convenient and Sum of Inflight entertainment



**100% stacked counn chart**

Sum of Baggage handling, Sum of Checkin service, Sum of Departure/Arrival time convenient and Sum of Cleanliness



**Line Chart**

Sum of Education by Salary



**Area Chart**

Sum of Education by Salary



## Introduction to Data Modelling

Data Modelling is the foundation of effective Power BI reports and visualizations. It involves organizing and structuring data to optimize query performance, analysis, and insights. A well-designed data model ensures that your reports are accurate, efficient, and easy to understand.

## Key Concepts

- **Data Sources:** Power BI supports various data sources, including Excel, CSV, SQL Server, Azure SQL Database, Power BI Datasets, and more.
- **Import vs. Direct Query:**
  - **Import:** Data is copied into the Power BI model, allowing for fast query performance and offline capabilities.
  - **Direct Query:** Data is queried directly from the source database, reducing storage requirements but potentially impacting performance.
- **Relationships:** Define how tables are connected based on standard columns. Relationships are crucial for data analysis and calculations.
- **Data Types:** Assign appropriate data types to columns (e.g., text, number, date) to ensure accurate calculations and visualizations.
- **Measures:** Calculated columns that perform calculations based on other columns or tables.
- **Hierarchies:** Group related data into levels for easy exploration and filtering.

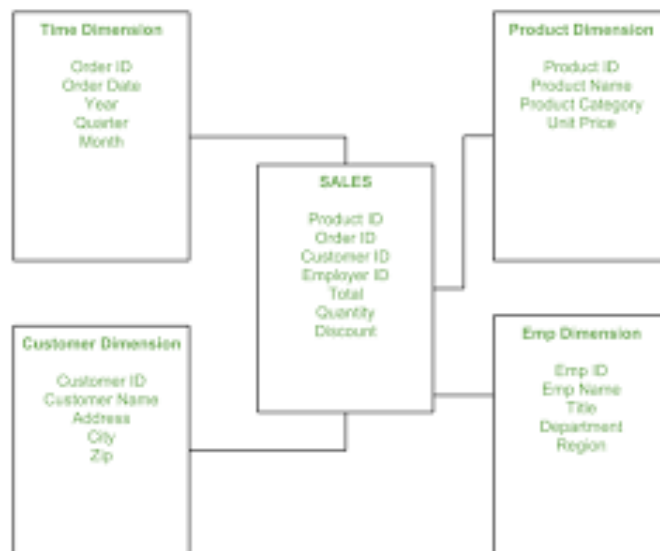
## Data Modelling Process

1. **Data Acquisition:** Connect to your data sources and import or directly query the required data.
2. **Data Transformation:** Clean, shape, and transform data using Power Query Editor to prepare it for Modelling.
3. **Create Relationships:** Establish relationships between tables based on standard columns.
4. **Create Calculated Columns and Measures:** Define calculated columns and measures to derive new information from your data.
5. **Optimize Model Performance:** Analyse and improve model performance using data compression, indexing, and query optimization techniques.

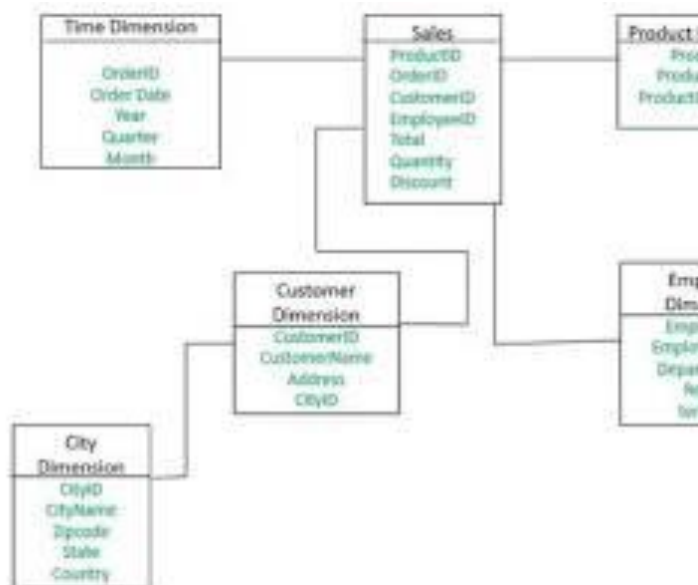
## Data Model Diagram

### Star Schema vs. Snowflake Schema

- **Star Schema:** A simple data model with a central fact table surrounded by dimension tables.



- **Snowflake Schema:** A more complex data model where dimension tables are further normalized or sub-divided into smaller tables.



### Best Practices

- **Start with a Strong Data Foundation:** Ensure data quality and accuracy before Modelling.
- **Understand Your Business Requirements:** Design the model to support the specific needs of your users.
- **Keep It Simple:** Avoid overly complex models that can impact performance.
- **Optimize for Performance:** Use data compression, indexing, and query optimization techniques.
- **Leverage DAX for Calculations:** Use Data Analysis Expressions (DAX) to create powerful calculations.
- **Test Thoroughly:** Validate your model with sample data to identify and fix issues.

### Additional Tips

- Use clear and descriptive column names.
- Create informative tooltips for columns and measures.
- Leverage Power BI's data Modelling features (e.g., hierarchies, calculated columns, measures).
- Consider using Power BI Desktop's Analyse Model feature for in-depth analysis.

## 6. Dashboard Options in Power BI

### Understanding Dashboards

A Power BI dashboard is a single-page view of key performance indicators (KPIs) and visualizations to monitor business health. It's a collection of tiles, each representing a visualization from a report.

### Creating Dashboards

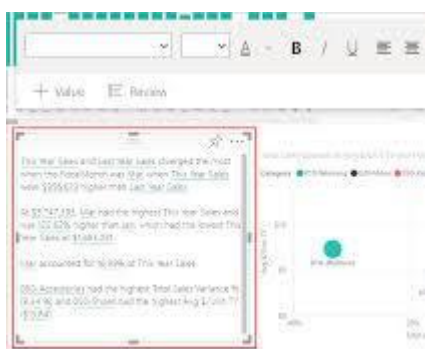
- **Pinning from Reports:** The most common method. You can pin visualizations from Power BI reports directly to a dashboard.
- **Creating Tiles Directly:** You can create tiles directly on a dashboard using Q&A or other methods.

### Types of Tiles

- **Visualizations:** These are the most common type, representing charts, graphs, tables, and other visual representations of data.



- **Text:** You can add text boxes to provide explanations or context for visualizations.



- **Images:** Incorporate images to enhance visual appeal or provide additional information.
- **R Visuals:** For advanced users, R visuals offer custom visualizations created using R code.

## Customization Options

- **Layout:** Arrange tiles freely on the canvas to create a visually appealing layout.
- **Size:** Resize tiles to fit the desired space.
- **Formatting:** Customize the appearance of tiles with colors, fonts, and other formatting options.
- **Filters:** Apply filters to tiles to focus on specific data segments.
- **Refresh:** Set refresh schedules for dashboard data to ensure it's always up-to-date.

## Sharing Dashboards

- **Sharing Links:** Generate sharing links to provide access to the dashboard.
- **Embedding:** Embed dashboards into websites or applications.
- **Export:** Export dashboards as images or PDFs for distribution.

## Best Practices

- **Focus on Key Metrics:** Only include the most important information.
- **Clear and Concise:** Use clear and concise titles and labels.
- **Visual Appeal:** Design dashboards with a visually pleasing layout.
- **Interactive:** Allow users to drill down into details by selecting tiles.
- **Mobile Optimization:** Ensure dashboards are responsive for different screen sizes.

## Additional Features

- **Q&A:** Ask natural language questions about your data and visualize the results.



- **Parameters:** Create interactive dashboards by allowing users to filter data based on parameters.
- **Bookmarks:** Save different views of a dashboard for easy access.

By effectively utilizing these options and best practices, you can create powerful and informative dashboards that provide valuable insights for your audience.

# 7.Excel Integration in Power BI

Excel integration with Power BI is a powerful combination that enables users to leverage the strengths of both tools for data analysis and visualization. Here's a breakdown of how they work together:

## Key Integration Points

1. **Importing Excel Data into Power BI:**
  - You can directly import Excel files (.xlsx, .xls) into Power BI Desktop.
  - Power BI will automatically detect tables and relationships, allowing you to create visualizations and reports based on the Excel dataset.
2. **Power Query in Excel and Power BI:**

- Both Excel and Power BI use Power Query for data transformation and cleaning.
  - You can create complex data transformations in Excel and then import the resulting data into Power BI.
  - This ensures consistency in data preparation across both tools.
3. **Creating Power BI Reports from Excel Data:**
- Once you've imported Excel data into Power BI, you can create interactive reports and dashboards.
  - Leverage Power BI's rich visualization capabilities to explore your data in new ways.
4. **Analyse in Excel:**
- This feature allows you to analyse Power BI datasets directly within Excel.
  - You can create PivotTables, PivotCharts, and other Excel calculations based on Power BI data.
  - Changes made in Excel can be reflected back in Power BI (with certain limitations).
5. **Embedding Power BI Visualizations in Excel:**
- You can embed Power BI visualizations directly into Excel worksheets.
  - This provides a seamless way to combine static Excel data with dynamic Power BI visuals.

#### **Benefits of Excel Integration**

- **Leverage Familiar Tools:** Utilize Excel's familiarity for data preparation and analysis.
- **Enhanced Visualization:** Benefit from Power BI's advanced visualization capabilities.
- **Improved Collaboration:** Share insights between Excel and Power BI users.
- **Increased Efficiency:** Streamline data workflows by combining the strengths of both tools.

By effectively integrating Excel and Power BI, you can create more comprehensive and insightful data analysis solutions.

## **8.Sharing Power BI Dashboards**

There are several ways to share your Power BI dashboards with others:

### **1. Sharing a Link**

- **Direct Sharing:** You can share a direct link to the dashboard with specific people or groups. This is ideal for smaller audiences.
- **Copy Link:** Generate a shareable link and copy it to share with others.
- **Share via Email:** Power BI allows you to share the link directly via email.

### **2. Embedding Dashboards**

- **Embed in Websites or Applications:** You can embed dashboards into websites or applications using an embed code provided by Power BI.
- **Power BI App:** Create a Power BI app and distribute it to a larger audience. This is useful for sharing multiple dashboards and reports.

### 3. Publishing to Web

- **Create a Public Link:** Generate a public link to share the dashboard with anyone who has the link. Be cautious about data sensitivity when using this option.

### 4. Sharing via Teams

- **Share in Teams:** You can directly share a dashboard or report within a Microsoft Teams channel. This is convenient for team collaboration.

### 5. Using Content Packs

- **Create a Content Pack:** Bundle multiple dashboards, reports, and datasets into a content pack and share it with specific groups or the entire organization.

### Important Considerations

- **Permissions:** Define appropriate permissions for users (view, edit, or own).
- **Security:** Protect sensitive data by using appropriate sharing methods and security settings.
- **Licensing:** Ensure users have the necessary Power BI licenses to access the shared content.
- **Data Refresh:** Consider data refresh schedules to keep the dashboard up-to-date.

### Additional Tips:

- Use clear and descriptive titles for dashboards and reports.
- Provide context and explanations for visualizations.
- It is recommended that the dashboard be tested on different devices and screen sizes.

Thus, you can effectively share your Power BI dashboards and insights with your audience.

## 9.DAX Basics in Power BI

DAX: The Powerhouse Behind PowerBI

**DAX (Data Analysis Expressions):** DAX is a powerful language of formulas that fuels calculations within Power BI, Excel Power Pivot, and SQL Server Analysis Services. It's designed to work seamlessly with relational data, enabling complex analysis and modeling.

### **How DAX Works**

DAX operates on tables and columns, using a variety of functions to perform calculations. These calculations range from simple aggregations (like sums and averages) to intricate time intelligence and filtering operations. A unique aspect of DAX is its context-aware nature, meaning calculations adapt based on applied filters, slicers, and other interactive elements in your report.

### **Key Uses of DAX**

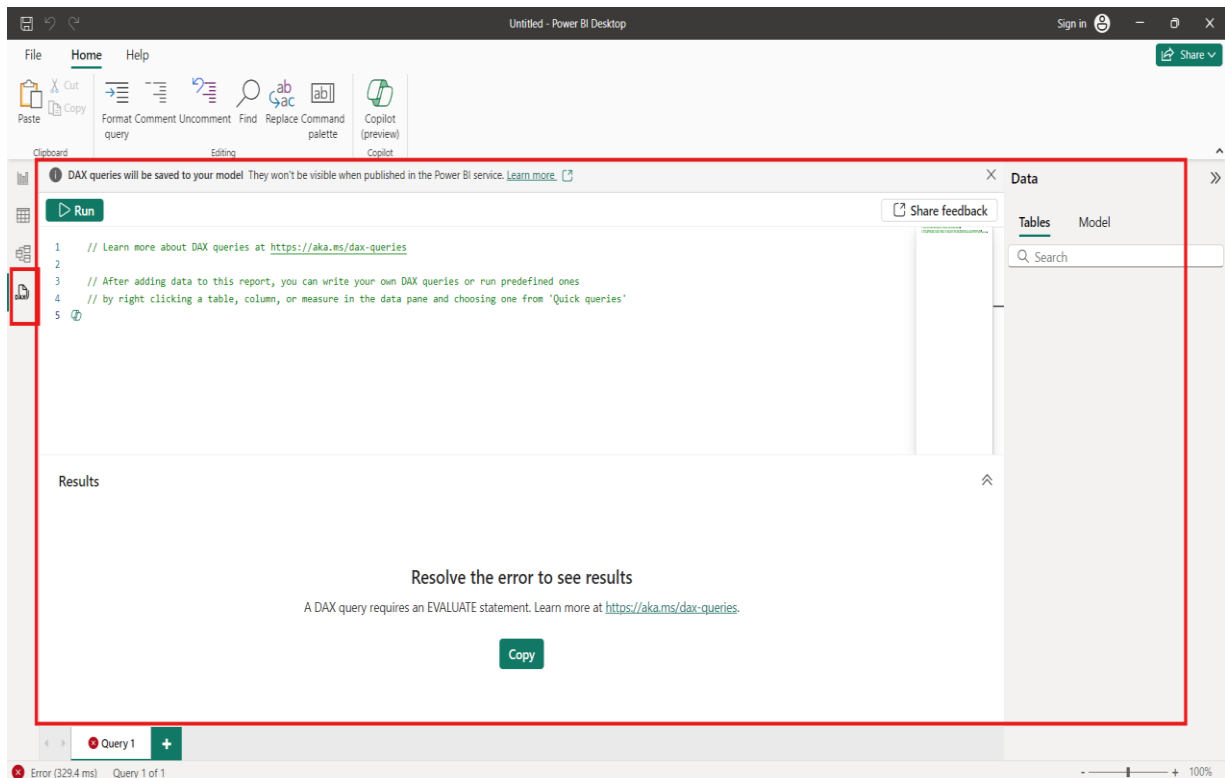
- **Measures:** Create dynamic calculations for your reports, such as total sales, average cost, or growth rates.
- **Calculated Columns:** Add new columns to your tables based on existing data, enabling further analysis and calculations.
- **Tables:** Generate entirely new tables derived from your existing data, providing flexibility in data modeling.

### **DAX in Action**

The DAX query editor in Power BI provides a user-friendly interface for creating and managing DAX formulas.

By mastering DAX, you can unlock the full potential of your data, uncovering valuable insights that drive informed decision-making.





## DAX syntax:

Basic DAX syntax looks similar like Excel formulas but it is used for Power BI and data models.

Here is simple example of DAX formula:

Total Sales = SUM(Sales[SalesAmount])

## Basic DAX Functions:

- Aggregation Functions:

SUM (), AVERAGE (), MIN (), MAX (), COUNT (), COUNTROWS ()

- Logical Functions:

IF (), AND (), OR (), SWITCH ()

- Date and Time Functions:

YEAR (), MONTH (), DAY (), DATE (), DATEDIFF ()

- Time Intelligence Functions:

TOTALYTD (), TOTALQTD (), TOTALMTD (), DATESYTD (), DATESQTD (), DATESMTD ()

- Filter Functions:

FILTER (), ALL (), ALLEXCEPT (), CALCULATE (), CALCULATETABLE ()

- Text Functions:

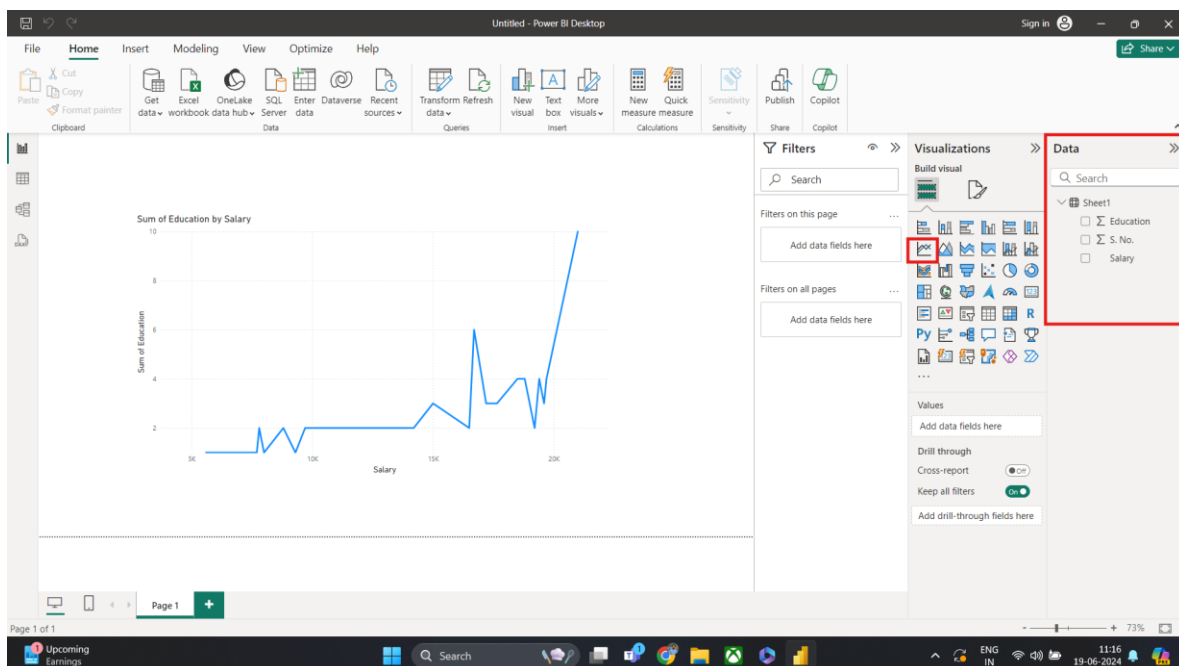
CONCATENATE (), LEFT (), RIGHT (), MID (), SEARCH ()

**Let's do a simple operation of DAX:**

**Step 1: Open Power BI desktop.**

**Step 2: Get Data**

Upload data using get data option, here I am uploading an excel file.

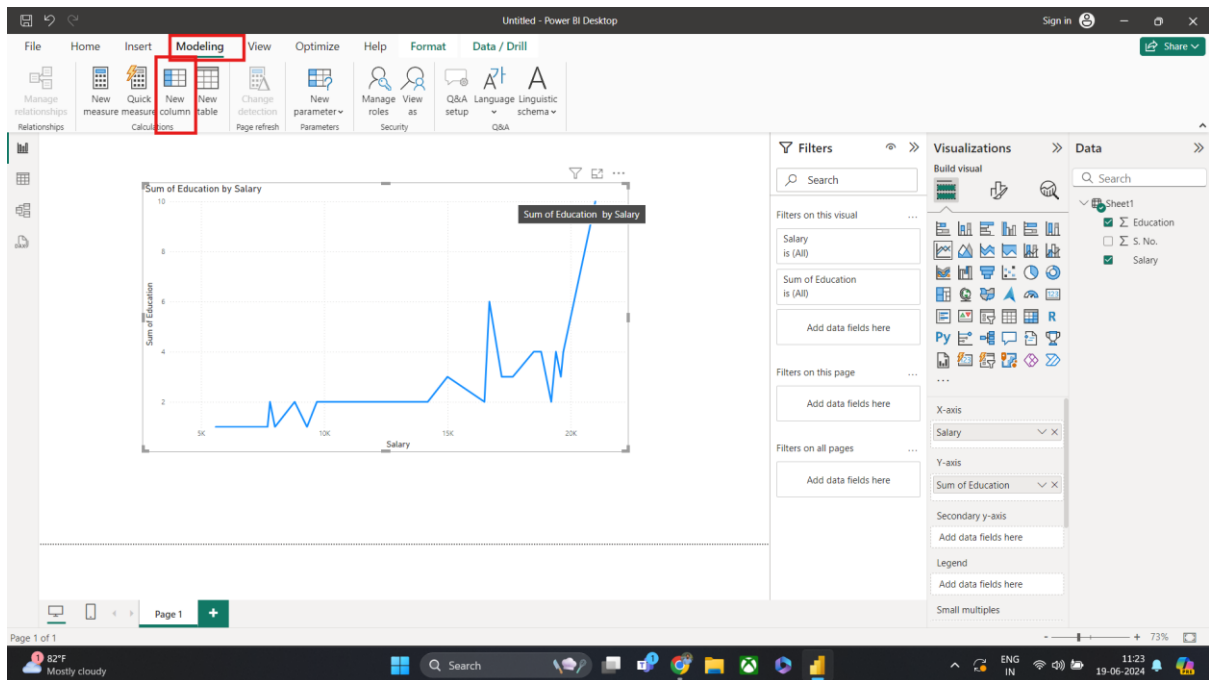


As you can see in the above image that I have uploaded excel file and visualized using line graph the relation between 'Education' and 'Salary'.

Now let's do a simple operation of adding an average of salary column using 'Average' function.

**Step 3:**

Go to 'Modelling' pane on menu bar and there select 'New column' option.

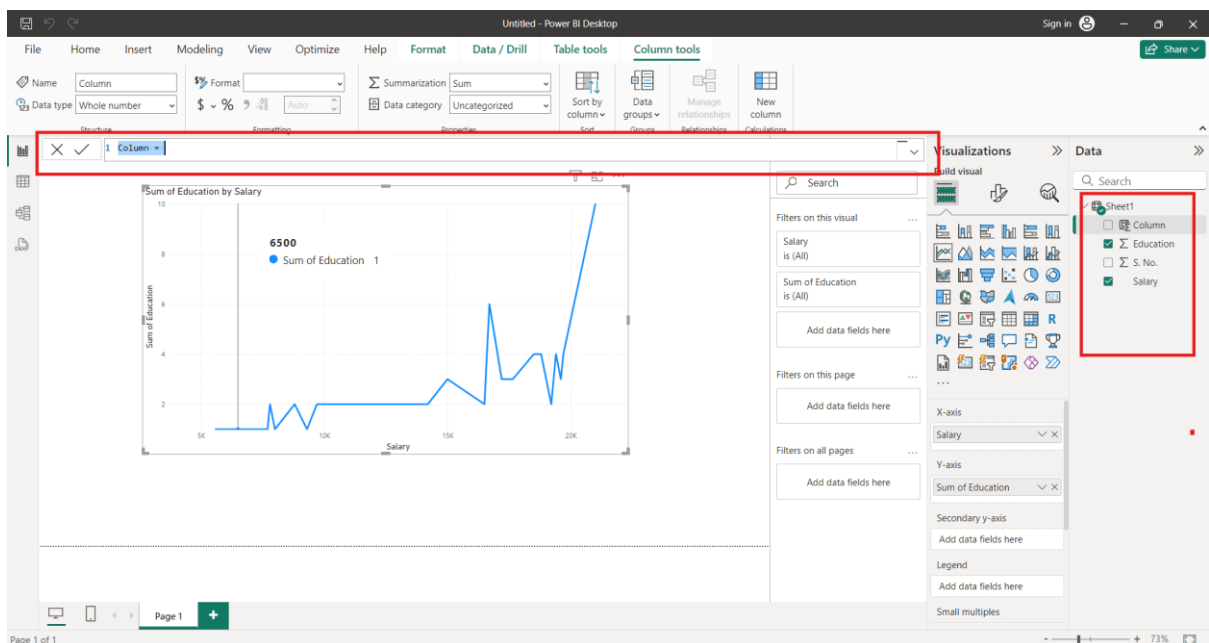


#### Step4:

After Clicking on 'New column' you will see an bar under it where you can name your column and using different function you can add whatever you want to add.

And you can see a new column get added in right pane under data field.

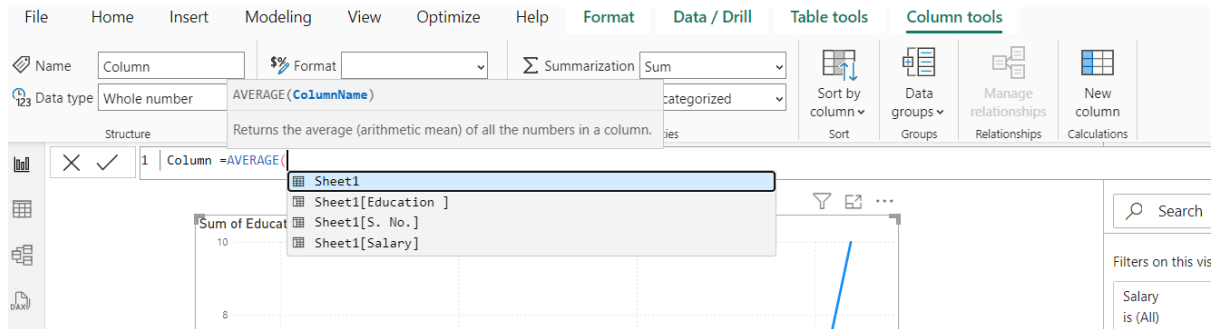
Here is the image showing these details:



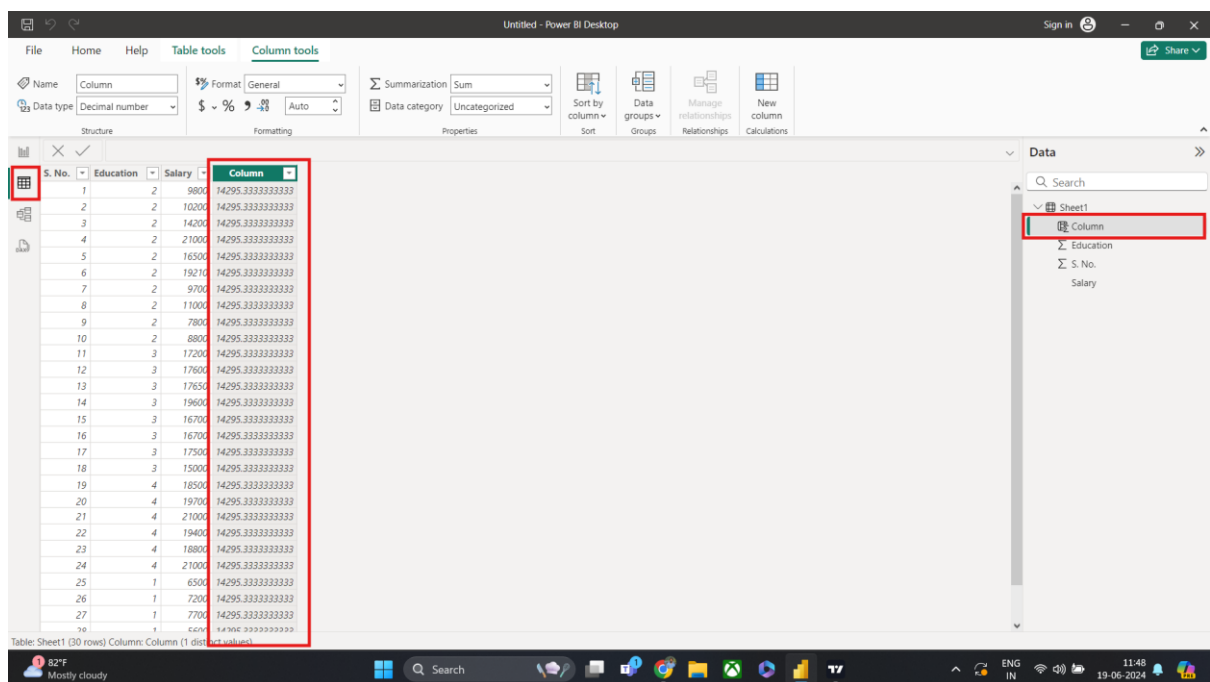
#### Step5:

Here I will show using 'Average' function.

Now in front of column name use function you want to, here I'm using Average function for salary as you can see in below image.



And after selecting for Salary Average and running the function in table view you can see a new column of salary average gets added.



## Step6:

As the new columns gets added in your already existing table, the added column now you can use in visualizations as column appears in data field on right you can visualize by selecting it.

The screenshot displays the Microsoft Power BI Desktop interface. The main area shows a line chart titled "Sum of Education and Sum of Column by Salary". The X-axis is labeled "Salary" and ranges from 0K to 20K. The Y-axis is labeled "Sum of Education and Sum of Columns" and ranges from 0K to 40K. The chart contains two data series: "Sum of Education" (blue line) and "Sum of Column" (dark blue line). The "Sum of Education" series shows a sharp increase at a salary of 19,700, reaching a value of 4. The "Sum of Column" series shows a sharp increase at a salary of 14,295.33, reaching a value of 33. The chart is highlighted with a red rectangle.

The right-hand pane shows the "Fields" task pane. The "Data" section is expanded, showing a table named "Sheet1" with columns: "Column", "Education", "S. No.", and "Salary". The "Salary" column is selected, and the "Sum of Education" and "Sum of Column" measures are visible in the "Visualizations" pane.

This is how you can use various DAX functions and add columns table to existing data and visualize them which helps a lot in handling different types of data.

DAX is continuously evolving and adding some new functions to it, here are some recently added functions of DAX.

**LAST:** Retrieves a value in the visual matrix from the last row of an axis.

**MATCHBY:** To match data and identify current row.

**RANK** : Return unique ranking for curren context.

LINEST:

Here are videos you should go through to learn basics of DAX in power BI:

[https://youtu.be/T\\_hFMQdqhzY?si=e8m9NbxiSUtS\\_G0R](https://youtu.be/T_hFMQdqhzY?si=e8m9NbxiSUtS_G0R)

[https://youtu.be/-QOtL\\_LOc40?si=4QTnUMU44aS2ycPg](https://youtu.be/-QOtL_LOc40?si=4QTnUMU44aS2ycPg)

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