



DATA VISUALIZATION WITH POWERBI

With Samuel Gerken



Agenda

- Why PowerBI is an essential tool for analytics
- Key features of PowerBI
- Data Transformation
- Data Visualization
- Q&A



What is PowerBI?

- PowerBI is a data visualization and business analytics tool that connects to multiple data sources and transforms them into interactive insights.
- Components of PowerBI
 - PowerBI Desktop
 - PowerBI Service
 - PowerBI Mobile



Component Explanation

PowerBI Desktop	PowerBI Service	PowerBI Mobile
This is where you create your reports and dashboards	Allows you to organize, manage, and distribute your reports and other Power BI items	Allows consumers to view reports in a mobile-optimized format. You can create these optimized report views in Power BI Desktop



Why use PowerBI?

- Growing need for data-driven decision-making
- PowerBI helps businesses and data professionals analyze large datasets quickly and easily.
- Popular with retail, healthcare, and financial companies



Internships Requesting PowerBI

Summer Associate Internship (Savings & Membership - Data Governance)

Navy Federal Credit Union [\[link\]](#) | Pensacola, FL • Hybrid work

\$38 - \$46 an hour

[Apply now](#) [\[link\]](#)



Qualifications

- Currently pursuing a graduate degree in Information Systems, Business Analytics, Data Science, Analytics, or other related degree
- Exposure to scripting languages (Python, R, etc.)
- Experience with SQL
- Experience with data visualization (PowerBI, Tableau)
- Knowledge of cloud technologies (Databricks, Microsoft Azure)
- Excellent communication and presentation skills
- Experience working with ambiguous problems
- Curious and excited to collaborate with various business units

Business Intelligence Intern

CONMED [\[link\]](#) | Largo, FL 33773

[Apply now](#) [\[link\]](#)



Work directly with the Director of Business Analytics, Operations to support the BI needs of the Operations organization.

Responsibilities:

- Use the Microsoft Power Platform to deliver tools and reports to the organization
- Evaluate the effectiveness and capability of new data sources and data gathering techniques.
- Transforming data into a new format to make it more appropriate for analysis using SQL and Power BI.
- Develop algorithms and models to mine large data sets.
- Use statistical analysis to identify patterns, correlations, and actionable results.

Summer Associate Internship (Business Systems Analyst - Digital Risk Office)

Navy Federal Credit Union [\[link\]](#) | Pensacola, FL • Hybrid work

\$26 - \$46 an hour

[Apply now](#) [\[link\]](#)



Qualifications

- Currently nearing the completion of bachelor's degree or pursuing a master's degree in Information Technology, Computer Science, Data Analytics, Statistics, or a related degree.
- Experience with research, analysis, and data manipulation.
- Experience using data and analytic tools such as: PowerBI, Databricks, SQL, Python, R, or Tableau.



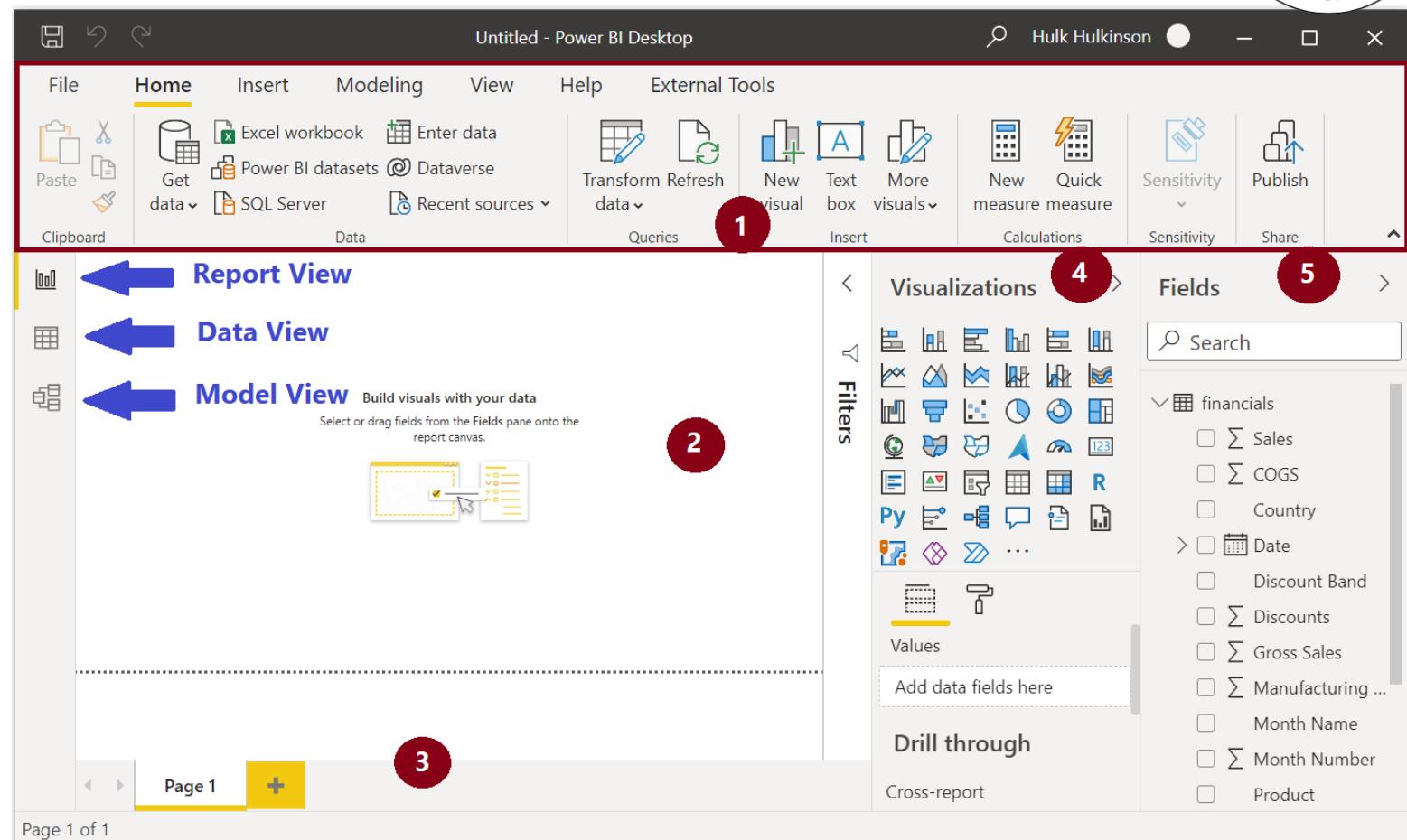
Sample Data

	Book Store			In Person			Amazon		
	T-Shirts	Accessories	Miscellaneous	T-Shirts	Accessories	Miscellaneous	T-Shirts	Accessories	Miscellaneous
2014	33323	13394	4455	33323	13394	4455	33323	13394	4455
2015	55342	19983	5563	55342	19983	5563	55342	19983	5563
2016	33234	18884	3348	33234	18884	3348	33234	18884	3348
2017	33252	19893	2239	33252	19893	2239	33252	19893	2239
2018	22332	18840	2232	22332	18840	2232	22332	18840	2232
2019	23331	18890	4343	23331	18890	4343	23331	18890	4343
2020	33532	18790	3434	33532	18790	3434	33532	18790	3434
2021	11001	11000	8840	11001	11000	8840	11001	11000	8840
2022	10221	9900	8892	10221	9900	8892	10221	9900	8892



Home Screen

1. Ribbon - Displays common tasks
2. Report view, or canvas - Where visualizations are created and arranged.
3. Pages tab - Located along the bottom of the page, this area is where you would select or add a report page.
4. Visualizations pane - Where you can create visualizations
5. Fields pane - Where query elements and filters can be dragged onto the Report view





Power Query

1. Ribbon - Enables you to interact with the data in the query.
2. Queries - For selecting, viewing, and shaping data
3. Center Pane - data from the selected query is displayed
4. Query Settings - Lists the query's properties and applied steps.

The screenshot shows the Microsoft Power Query Editor window. The ribbon at the top has tabs for File, Home, Transform, Add Column, View, Tools, and Help. The Home tab is selected. The ribbon icons include Close & Apply, New Source, Recent Sources, Enter Data, Data source settings (highlighted with a red circle 1), Manage Parameters, Refresh Preview, Advanced Editor, Manage Columns, Reduce Rows, Sort, Split Column, Group By, Data Type (Text), Use First Row as Headers, Replace Values, and Transform. The main area shows a 'Queries [1]' pane with a 'financials' query selected (highlighted with a red circle 2). The center pane displays a table with three columns: Segment, Country, and Product. The data rows are: 1. Government, Canada, Carretera; 2. Government, Germany, Carretera; 3. Midmarket, France, Carretera; 4. Midmarket, Germany, Carretera; 5. Midmarket, Mexico, Carretera; 6. Government, Germany, Carretera; 7. Midmarket, Germany, Montana; 8. Channel Partners, Canada, Montana; 9. Government, France, Montana; 10. Channel Partners, Germany, Montana; 11. Midmarket, Mexico, Montana. The right pane, titled 'Query Settings' (highlighted with a red circle 4), shows the 'Name' field set to 'financials' and the 'APPLIED STEPS' section which includes 'Source', 'Navigation', and 'Changed Type'.

Segment	Country	Product
Government	Canada	Carretera
Government	Germany	Carretera
Midmarket	France	Carretera
Midmarket	Germany	Carretera
Midmarket	Mexico	Carretera
Government	Germany	Carretera
Midmarket	Germany	Montana
Channel Partners	Canada	Montana
Government	France	Montana
Channel Partners	Germany	Montana
Midmarket	Mexico	Montana



Connecting to a Data Source

The screenshot shows the Microsoft Power BI application interface. The ribbon is visible at the top with tabs: File, Home (selected), Insert, Modeling, View, Optimize, and Help. Under the Home tab, the 'Clipboard' group contains Paste, Cut, Copy, and Format painter. The 'Data' group contains Get data, Excel, OneLake, SQL Server, Enter data, Dataverse, Recent sources, Transform data, and Refresh data. A dropdown menu titled 'Common data sources' is open under 'Get data'. It lists several options: Excel workbook, Power BI semantic models, Dataflows, Dataverse, SQL Server, and Analysis Services. The 'Excel workbook' option is highlighted, with a tooltip 'Import data from a Microsoft Excel workbook' appearing next to it. Below the dropdown, there is a message: 'Add data to your report' and 'Your data will appear in the Data pane.'



Connecting to a Data Source

Navigator

Display Options

PowerBI Workshop Data - Copy.xlsx [1]
 Sheet1

Sheet1
Preview downloaded on Wednesday

Column1	Book Store	Column3	Column4	In Person	Column
null	T-Shirts	Accessories	Miscellaneous	T-Shirts	Accessc
2014	33323	13394	4455	33323	
2015	55342	19983	5563	55342	
2016	33234	18884	3348	33234	
2017	33252	19893	2239	33252	
2018	22332	18840	2232	22332	
2019	23331	18890	4343	23331	
2020	33532	18790	3434	33532	
2021	11001	11000	8840	11001	
2022	10221	9900	8892	10221	

< >

Load Transform Data Cancel



Connecting to a Data Source

The screenshot shows the Microsoft Power BI desktop application interface. The ribbon at the top has the "Home" tab selected. The "Data" tab is highlighted in the "Queries" section of the ribbon. A red circle highlights the "Transform Refresh data" button in the ribbon. On the far right, the "Visualizations" pane is open, showing various visualization icons. A large red circle highlights the "Sheet1" node in the "Filters" tree view within the pane. The main canvas area displays a placeholder message: "Build visuals with your data" and "Select or drag fields from the Data pane onto the report canvas.", accompanied by a small icon illustrating the process.



Test File

File Home Transform Add Column View Tools Help

Close & Apply New Recent Enter Data Data source settings Manage Parameters Refresh Preview Properties Advanced Editor Choose Columns Remove Columns Keep Rows Remove Rows Sort Split Column Group By Data Type: Whole Number Use First Row as Headers Merge Queries Append Queries Combine Files Text Analytics Vision Azure Machine Learning AI Insights

Close New Query Data Sources Parameters Query Manage Columns Manage Rows Reduce Rows Sort Transform Combine

Queries [1]

Sheet1

	Column1	Book Store	Column3	Column4	In Person	Column6
1	null	T-Shirts	Accessories	Miscellaneous	T-Shirts	Accessories
2	2014	33323	13394	4455	33323	
3	2015	55342	19983	5563	55342	
4	2016	33234	18884	3348	33234	
5	2017	33252	19893	2239	33252	
6	2018	22332	18840	2232	22332	
7	2019	23331	18890	4343	23331	
8	2020	33532	18790	3434	33532	
9	2021	11001	11000	8840	11001	
10	2022	10221	9900	8892	10221	

= Table.TransformColumnTypes(#"Promoted Headers",{{"Column1", Int64.Type}, {"Book Store", type any}, {"Column3", type any}, {"Column4", type any}, {"In Person", type any}, {"Column6", type any}})

Query Settings

PROPERTIES

Name: Sheet1

All Properties

APPLIED STEPS

Source, Navigation, Promoted Headers, **Changed Type**

A red circle highlights the "Changed Type" step in the Applied Steps list.



Transpose

Screenshot of Microsoft Power Query Editor showing the Transpose step highlighted with a red circle.

The ribbon menu shows the "Transform" tab selected. The "Transpose" button is circled in red.

The main area displays a query named "Sheet1" with the following data:

	Column1	Column2	Column3	Column4	Column5	Column6
1	null	Book Store		null	In Person	
2	null	T-Shirts	Accessories	Miscellaneous	T-Shirts	Accessories
3	2014	33323		13394	4455	33323
4	2015	55342		19983	5563	55342
5	2016	33234		18884	3348	33234
6	2017	33252		19893	2239	33252
7	2018	22332		18840	2232	22332
8	2019	23331		18890	4343	23331
9	2020	33532		18790	3434	33532
10	2021	11001		11000	8840	11001
11	2022	10221		9900	8892	10221

The "Query Settings" pane on the right shows the query is named "Sheet1".



Use First Rows as headers

The screenshot shows the Microsoft Power BI Data Editor interface. The ribbon at the top has the 'Transform' tab selected. A red circle highlights the 'Use First Row as Headers' button in the 'Table' section of the ribbon. The main workspace displays a table named 'Table.Transpose(Sheet1_Sheet)' with 10 rows of data. The columns are labeled 'Column1' through 'Column6'. The first row contains category names like 'Book Store', 'In Person', and 'Amazon', while subsequent rows contain specific items and counts. The 'Properties' pane on the right shows the query is named 'Sheet1' and the applied step is 'Transposed Table'.

Column1	Column2	Column3	Column4	Column5	Column6
1	null	null	2014	2015	2016
2 Book Store	T-Shirts		33323	55342	33234
3	null Accessories		13394	19983	18884
4	null Miscellaneous		4455	5563	3348
5 In Person	T-Shirts		33323	55342	33234
6	null Accessories		13394	19983	18884
7	null Miscellaneous		4455	5563	3348
8 Amazon	T-Shirts		33323	55342	33234
9	null Accessories		13394	19983	18884
10	null Miscellaneous		4455	5563	3348



Give Column 1 and 2 Meaningful Names

The screenshot shows the Microsoft Power BI Data Editor interface. The main area displays a table with data. The first two columns are highlighted with a red oval, labeled "Seller" and "Category". The formula bar above the table shows the command: `= Table.RenameColumns(#"Changed Type",{{"Column1", "Seller"}, {"Column2", "Category"}})`. To the right, the "Query Settings" pane shows the "Name" is set to "Sheet1". The "APPLIED STEPS" pane lists the steps taken: Source, Navigation, Transposed Table, Renamed Columns, Promoted Headers, Changed Type, and Renamed Columns1 (which is currently selected).

	Seller	Category	2014	2015	2016	2017
1	Book Store	T-Shirts	33323	55342	33234	
2		Accessories	13394	19983	18884	
3		Miscellaneous	4455	5563	3348	
4	In Person	T-Shirts	33323	55342	33234	
5		Accessories	13394	19983	18884	
6		Miscellaneous	4455	5563	3348	
7	Amazon	T-Shirts	33323	55342	33234	
8		Accessories	13394	19983	18884	
9		Miscellaneous	4455	5563	3348	



Fill Down

A screenshot of the Microsoft Power BI Data Editor interface. The top ribbon shows tabs like File, Home, Transform, etc. A red circle highlights the 'Fill' dropdown in the 'Transform' tab's ribbon. The main area displays a table with columns Seller, Category, and three years of sales data (2014, 2015, 2016, 2017). The 'Seller' column has rows for Book Store, null (Accessories, Miscellaneous), and In Person. The 'Category' column has rows for T-Shirts, Accessories, and Miscellaneous. The '2014' column has values 33323, 13394, 4455, 33323, 13394, 4455, 33323, 13394, 4455. The '2015' column has values 55342, 19983, 5563, 55342, 19983, 5563, 55342, 19983, 5563. The '2016' column has values 33234, 18884, 3348, 33234, 18884, 3348, 33234, 18884, 3348. The '2017' column has values 33234, 18884, 3348, 33234, 18884, 3348, 33234, 18884, 3348. To the right, the 'Query Settings' pane shows 'Sheet1' under 'Name' and lists 'Renamed Columns1' under 'APPLIED STEPS'.

	Seller	Category	2014	2015	2016	2017
1	Book Store	T-Shirts	33323	55342	33234	33234
2	null	Accessories	13394	19983	18884	18884
3	null	Miscellaneous	4455	5563	3348	3348
4	In Person	T-Shirts	33323	55342	33234	33234
5	null	Accessories	13394	19983	18884	18884
6	null	Miscellaneous	4455	5563	3348	3348
7	Amazon	T-Shirts	33323	55342	33234	33234
8	null	Accessories	13394	19983	18884	18884
9	null	Miscellaneous	4455	5563	3348	3348



Select all year columns, Unpivot Columns

A screenshot of the Microsoft Power BI Data Editor interface. The main area shows a table with columns labeled 'i²3 2014', 'i²3 2015', 'i²3 2017', 'i²3 2018', and 'i²3 2019'. The 'i²3 2014' and 'i²3 2015' columns are highlighted in green, while the others are greyed out. A context menu is open over the greyed-out columns, with the 'Unpivot Columns' option circled in red. A tooltip for 'Unpivot Columns' states: 'Translate all but the currently unselected columns into attribute-value pairs.' To the right, the 'Query Settings' pane shows the query name is 'Sheet1' and lists applied steps including 'Filled Down'. The top ribbon shows tabs like File, Home, Transform, etc.



Rename Attribute to Year

The screenshot shows the Microsoft Power BI Data Editor interface. The title bar says "Test File". The ribbon has tabs: File, Home, Transform, Add Column, View, Tools, Help. The "Transform" tab is selected. The ribbon contains various tools like Transpose, Data Type, Replace Values, Unpivot Columns, etc. Below the ribbon is a toolbar with icons for Group By, Use First Row as Headers, Count Rows, Rename, Pivot Column, Convert to List, Split Column, Format, Extract, Parse, Statistics, Date, Time, Duration, and Scripts. The main area shows a table with three rows of data: Seller, Category, Year, Value. The "Year" column header is circled in red. The formula bar shows the query: = Table.UnpivotOtherColumns(#"Filled Down", {"Seller", "Category"}, "Attribute", "Value"). The "Query Settings" pane on the right shows the "Properties" section with "Name: Sheet1" and "Applied Steps" section with steps: Source, Navigation, Transposed Table, Renamed Columns, Promoted Headers, Changed Type, Renamed Columns1, Filled Down, and Unpivoted Columns (which is highlighted).

Seller	Category	Year	Value
Book Store	T-Shirts	2014	33323
Book Store	T-Shirts	2015	55342
Book Store	T-Shirts	2016	33234
Book Store	T-Shirts	2017	33252
Book Store	T-Shirts	2018	22332
Book Store	T-Shirts	2019	23331
Book Store	T-Shirts	2020	33532
Book Store	T-Shirts	2021	11001
Book Store	T-Shirts	2022	10221
Book Store	Accessories	2014	13394
Book Store	Accessories	2015	19983
Book Store	Accessories	2016	18884
Book Store	Accessories	2017	19893
Book Store	Accessories	2018	18840
Book Store	Accessories	2019	18890
Book Store	Accessories	2020	18790
Book Store	Accessories	2021	11000
Book Store	Accessories	2022	9900
Book Store	Miscellaneous	2014	4455
Book Store	Miscellaneous	2015	5563
Book Store	Miscellaneous	2016	3348
Book Store	Miscellaneous	2017	2239
Book Store	Miscellaneous	2018	2232
Book Store	Miscellaneous	2019	4343
Book Store	Miscellaneous	2020	3434
Book Store	Miscellaneous	2021	8840
In Person	T-Shirts	2014	33323



Make Value and Year column a whole number

The screenshot shows the Microsoft Power Query Editor interface. A red circle highlights the 'Value' column in the 'Sheet1' table, which contains data from rows 1 to 28. The 'Value' column currently has a data type of 'Whole Number'. A context menu is open over this column, showing options like 'Decimal Number', 'Fixed decimal number', 'Whole Number', and 'Percentage'. To the right of the table, the 'Query Settings' pane is visible, showing the 'APPLIED STEPS' section which includes 'Changed Type1' (highlighted with a blue border). The 'Properties' section shows the table is named 'Sheet1'.

	Seller	Category	Year	Value
1	Book Store	T-Shirts	2014	19893
2	Book Store	T-Shirts	2015	18840
3	Book Store	T-Shirts	2016	18890
4	Book Store	T-Shirts	2017	18790
5	Book Store	T-Shirts	2018	11000
6	Book Store	T-Shirts	2019	9900
7	Book Store	Accessories	2014	4455
8	Book Store	Accessories	2015	5563
9	Book Store	Accessories	2016	3348
10	Book Store	Accessories	2017	2239
11	Book Store	Accessories	2018	2232
12	Book Store	Accessories	2019	4343
13	Book Store	Accessories	2020	3434
14	Book Store	Miscellaneous	2021	8840
15	Book Store	Miscellaneous	2022	8892
16	In Person	T-Shirts	2014	33323



Close and Apply

The screenshot shows the Microsoft Power BI Editor interface. A red circle highlights the "Close & Apply" button in the top-left corner of the ribbon. The ribbon tabs include File, Home, Transform, Add Column, View, Tools, and Help. The main workspace displays a table titled "Table.TransformColumnTypes(#"Renamed Columns2", {"Value", Int64.Type})". The table has columns: Seller, Category, Year, and Value. The data shows sales figures for Book Store and In Person categories from 2014 to 2022. To the right of the table is a "Query Settings" pane. The "APPLIED STEPS" section lists the following steps: Source, Navigation, Transposed Table, Renamed Columns, Promoted Headers, Changed Type, Renamed Columns1, Filled Down, Unpivoted Columns, Renamed Columns2, and a step labeled "Changed Type1" which is currently selected.

	Seller	Category	Year	Value
1	Book Store	T-Shirts	2014	33323
2	Book Store	T-Shirts	2015	55342
3	Book Store	T-Shirts	2016	33234
4	Book Store	T-Shirts	2017	33252
5	Book Store	T-Shirts	2018	22332
6	Book Store	T-Shirts	2019	23331
7	Book Store	T-Shirts	2020	33532
8	Book Store	T-Shirts	2021	11001
9	Book Store	T-Shirts	2022	10221
10	Book Store	Accessories	2014	13394
11	Book Store	Accessories	2015	19983
12	Book Store	Accessories	2016	18884
13	Book Store	Accessories	2017	19893
14	Book Store	Accessories	2018	18840
15	Book Store	Accessories	2019	18890
16	Book Store	Accessories	2020	18790
17	Book Store	Accessories	2021	11000
18	Book Store	Accessories	2022	9900
19	Book Store	Miscellaneous	2014	4455
20	Book Store	Miscellaneous	2015	5563
21	Book Store	Miscellaneous	2016	3348
22	Book Store	Miscellaneous	2017	2239
23	Book Store	Miscellaneous	2018	2232
24	Book Store	Miscellaneous	2019	4343
25	Book Store	Miscellaneous	2020	3434
26	Book Store	Miscellaneous	2021	8840
27	In Person	T-Shirts	2014	33323



Create a Line Chart

The screenshot shows a Microsoft Power BI interface with a line chart titled "Sum of Value by Year". The chart displays data from 2015 to 2020, with values ranging from approximately 0.1M to 0.3M. The X-axis is labeled "Year" and the Y-axis is labeled "Sum of Value".

The "Visualizations" pane on the right side of the screen lists various chart types, with a blue line chart icon highlighted and circled in red. Below the visualization list, the "X-axis" is set to "Year" and the "Y-axis" is set to "Sum of Value".

The "Data" pane on the right shows the data source "Sheet1" with fields "Category", "Seller", "Σ Value", and "Σ Year". The "Σ Value" field is selected and highlighted with a red arrow pointing to it from the Y-axis setting in the Visualizations pane.



Create a Bar Chart

The screenshot shows the Power BI desktop interface with two visualizations on the canvas:

- A line chart titled "Sum of Value by Year" showing the trend of value from 2014 to 2021.
- A bar chart titled "Sum of Value by Category" showing the value for three categories: T-Shirts, Accessories, and Miscellaneous.

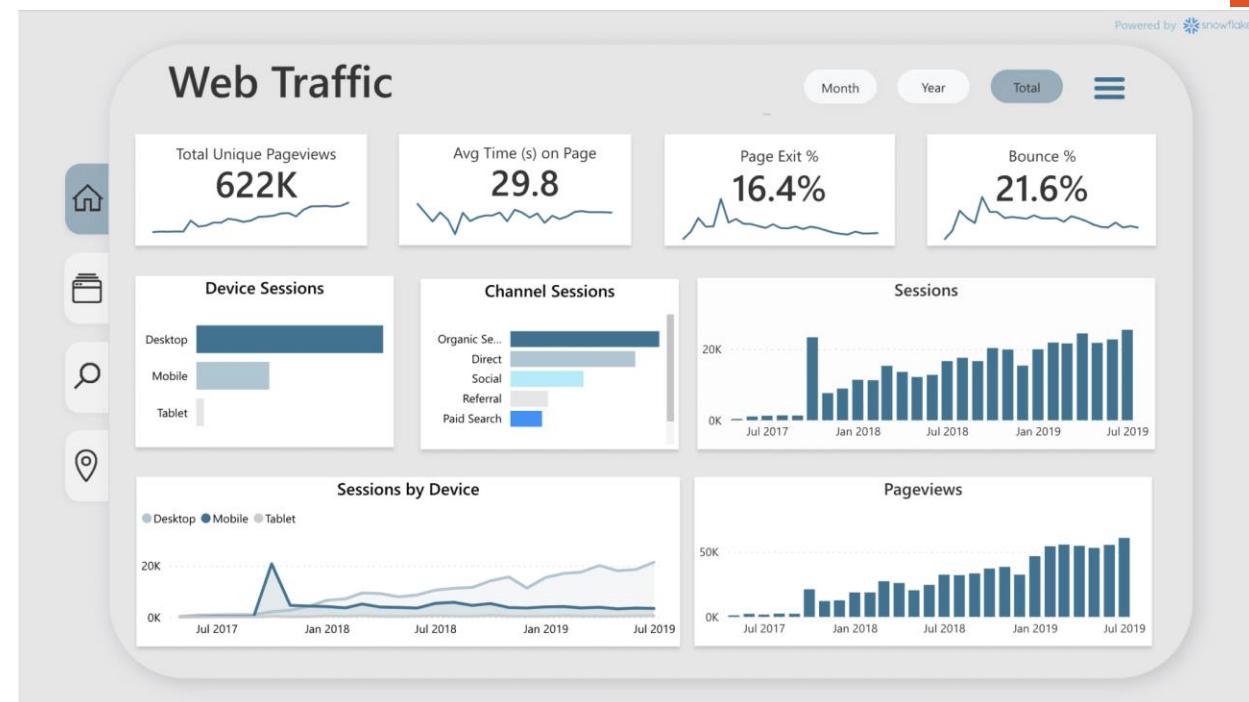
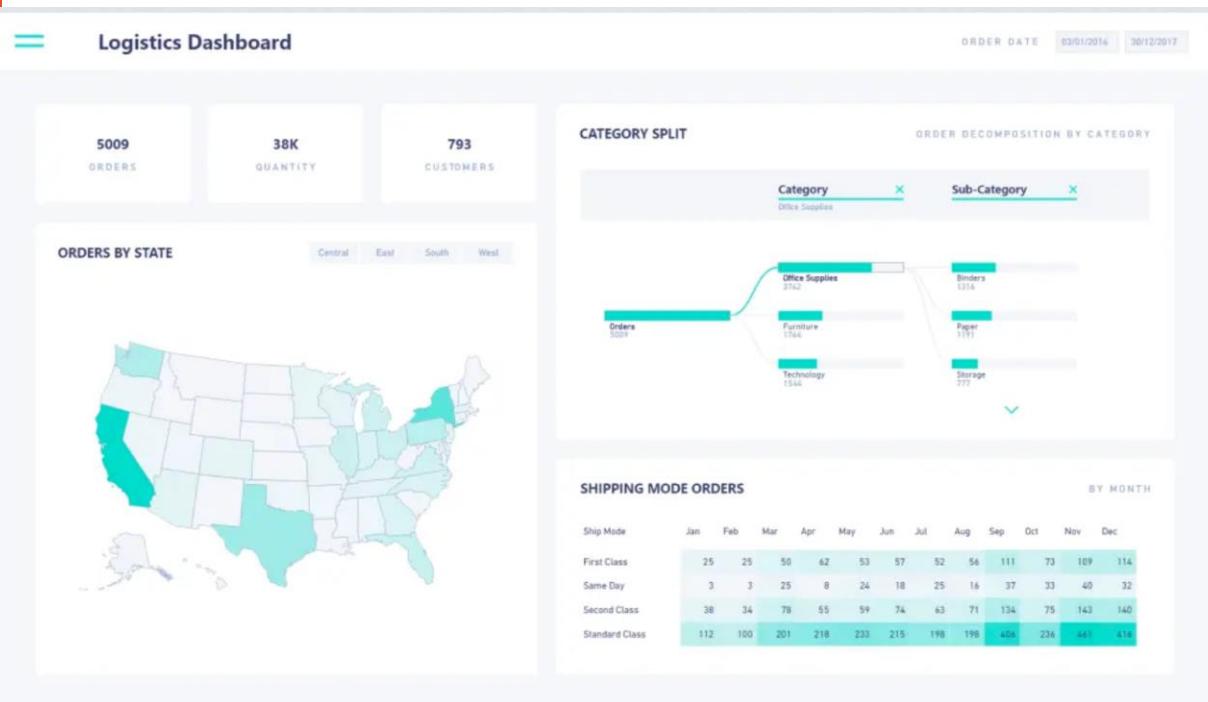
The "Build visual" pane on the right side of the interface is open, showing the configuration for the bar chart. Arrows point to specific settings:

- An arrow points to the "X-axis" dropdown set to "Category".
- An arrow points to the "Y-axis" dropdown set to "Sum of Value".
- A red circle highlights the "Visualizations" icon in the "Build visual" pane, which is also circled in the screenshot.

Category	Sum of Value
T-Shirts	~0.7M
Accessories	~0.4M
Miscellaneous	~0.1M

Data Visualization

- Easy to use, drag-and-drop functionality
- Minimal coding knowledge required



Questions?





FDOT Advertised Positions

District	Advertised Positions
CO	21
D1	6
D2	6
D3	1
D4	3
D5	3
D6	5
D7	3
FTE	2

Data from:
11/21/2024
11:20:02 PM

Microsoft Bing © 2024 Microsoft Corporation [Terms](#)

FDOT

Filters:

District	Broadband Group & Level	# Pos	Reporting County	# Pos
CO	Architect/Surveyor/Cartogr/Engr	18	Alachua	1
D1	Business Operations	8	Brevard	1
D2	Computer	3	Broward	3
D3	Construction	3	Columbia	3
D4	Finance	1	Duval	1
D5	Installation, Maint & Repair	2	Hillsborough	4
D6	Lawyers And Judges	5	Lake	1
D7	Manager	6	Lee	1
FTE	Office/Administrative Support	3	Leon	15
Total	Transportation/Material Moving	1	Levy	1
	Total	50	Miami-Dade	5

Results:

Position #	People First Working Title	Reporting City	Job Post URL
000054	Roadway Designer III	Bartow	🔗
000283	Senior Attorney	Tallahassee	🔗
000587	Project Administrator	Tallahassee	🔗
000818	Purchasing Agent I	Tallahassee	🔗
000820	Enterprise Program Manager	Tallahassee	🔗
001115	Network Support Specialist III	Gainesville	🔗
001376	Program Management Program Engineer	Kissimmee	🔗
002101	Auditor	Tallahassee	🔗
002222	Supervisor, Production Management	Tallahassee	🔗
002303	TSM&O Engineer-Freeways	Tampa	🔗
002360	Equipment Operator	Cape Coral	🔗
002564	Traffic Engineer II	Tampa	🔗
002780	Materials Coordinator-Pavement	Bartow	🔗
003017	District Permit Engineer	Bartow	🔗
003334	Structures Management Coordinator	Tampa	🔗
003590	Financial Services Support Specialist	Tallahassee	🔗

< 1 of 3 >

Data Science and Business Analytics Association at Florida Poly