Data Transformation and Visualization with Excel and Power BI

Temple Analytics Challenge 2018

Mary Garcia Charumilind, Director of Performance Analytics

1

Three parts of analytics

- 1. Back end: data and databases
- 2. Analysis: statistics
- 3. Communication: visualization

Today's Topics

- 1. Data Transformation and Modeling
 - Text-to-columns and Concatenate in Excel and Power BI
 - FIND, SEARCH, IF, IFERROR
 - Table Relationships
- 2. Communication visualization
 - Power Bl

Excel

• Do you have Excel 2016?

- Figure out which version you have: <u>https://support.office.com/en-us/article/About-Office-</u> <u>What-version-of-Office-am-I-using-932788B8-A3CE-44BF-BB09-E334518B8B19?ui=en-US&rs=en-US&ad=US</u>
- Excel 2016 can be downloaded from TUPortal: Look for the "Microsoft Download" link in the list on the left-hand side
 - Really Big data? Choose the 64-bit version and use a PC
 - Microsoft Excel 2016 for Mac doesn't have "Get & Transform" feature. This is a new feature which only applies to Excel 2016. "New Query" and "Query Editor" are included in "Get & Transform", so they are not available either
 - The TU TECH Center has PCs with Excel 2016 <u>https://computerservices.temple.edu/tech-center-software</u>
 - Fox MIS lab in Alter 602 has powerful machines, but 32-bit Excel

Power BI

- Free version is available to Temple students as part of Office 365
 - PCs only: <u>www.PowerBl.com</u> to download the desktop app
 - Powerful querying, modeling, data transformation, analysis, and visualization
 - Mac and PC: "the service" is online at <u>app.powerbi.com</u>
 - Powerful visualization
- Log in with your TU credentials

Transform data in Excel

- Remove duplicates to get a list of distinct or unique values in a column or table
 - Select data, copy, paste into new location, select the new data
 - Data -> Remove duplicates

Transform data in Excel

- Text to columns
 - Make sure you have enough empty columns to the right
 - Select the column
 - Data -> Text to columns
 - Delimited (usually)
 - Select delimiter(s) or type one in there
 - Click Next, Finish
- LEFT or RIGHT
- CONCATENATE or &

Transform data in Power BI Desktop (PC only)

Text to columns

Home	View	Modeling	He	lp
ζ Cut		<u>+</u> []		
🖹 Сору				
🌾 Format Pain	Ge ter Data	t Recent	Enter Data	Edit Queries 🕶
lipboard		External dat		

• Select the table and column

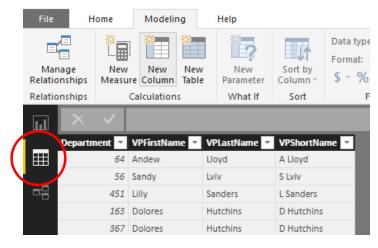


- Delimit by space, use left-most
- Click "Close and Apply" query changes





Transform data in Power BI Desktop (PC only)



• Use calculated columns in data view

- LEFT or RIGHT
- CONCATENATE or &

Transform Data in Excel or Power BI

- FIND is case-sensitive, and SEARCH is not case-sensitive
- IF, OR, and IFERROR
- DAX Example: FoodOrEnt = IF(OR(IFERROR(SEARCH("Food",CostElements[Cost element name]),0)=1,IFERROR(SEARCH("m&e",CostElements[Cost element name]),0)),1,0)

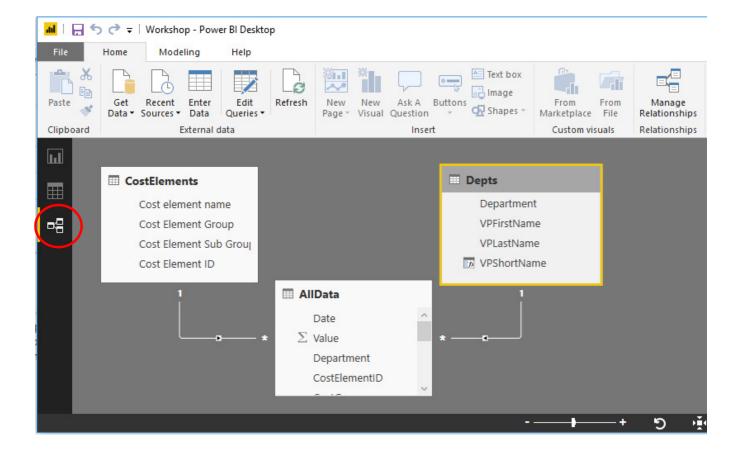
• DAX guides

- Updated: https://dax.guide/
- Official: <u>https://msdn.microsoft.com/en-us/query-bi/dax/dax-function-reference</u>

Create Relationships in Excel (PC Only)

- Each table must be a table
- Data -> Relationships -> New
- When inserting PivotTable select "Use data model"
- Each table must have a primary key
 - If you receive this error, add a unique row identifier to your table: Add a column and enter 1 in the 1st row of data, and 2 in the second . Hold down CTRL (or CMD) and double click with the skinny plus in the lower righthand corner of the cell to fill the numbers down.

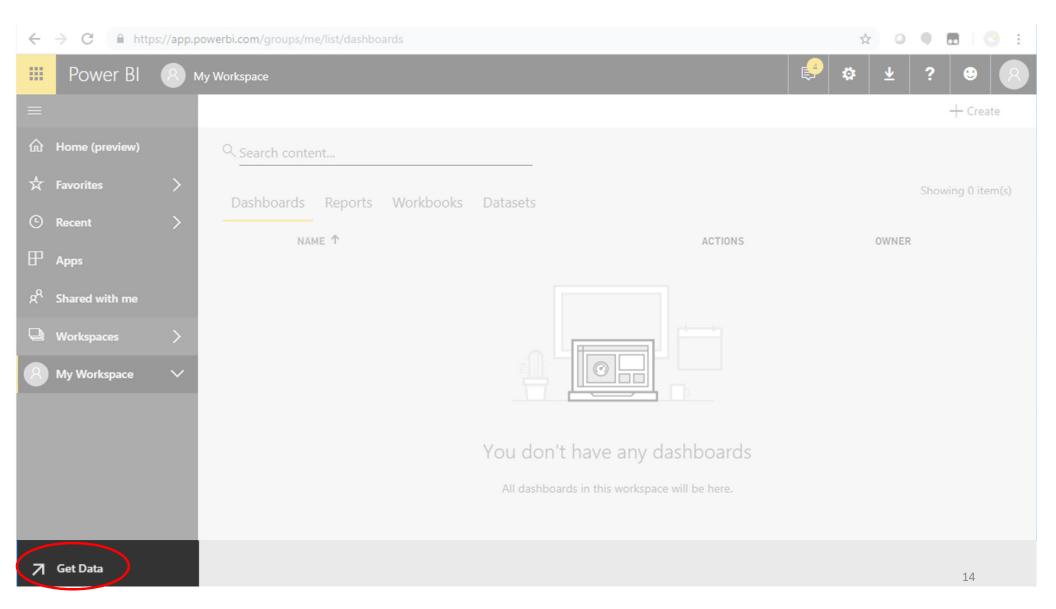
Create Relationships in Power BI Desktop (PC Only)

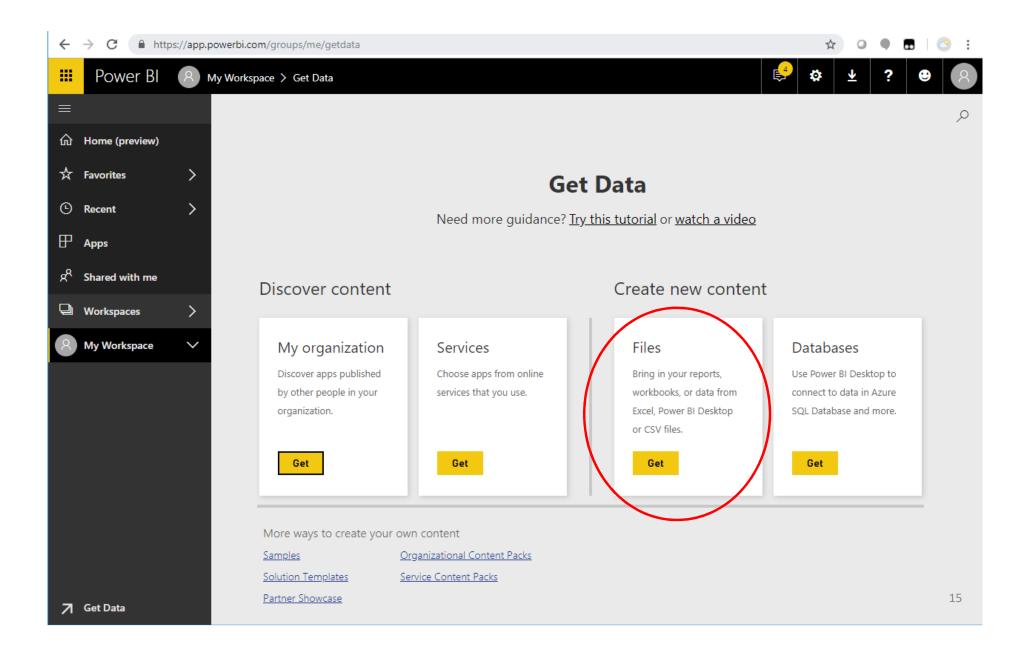


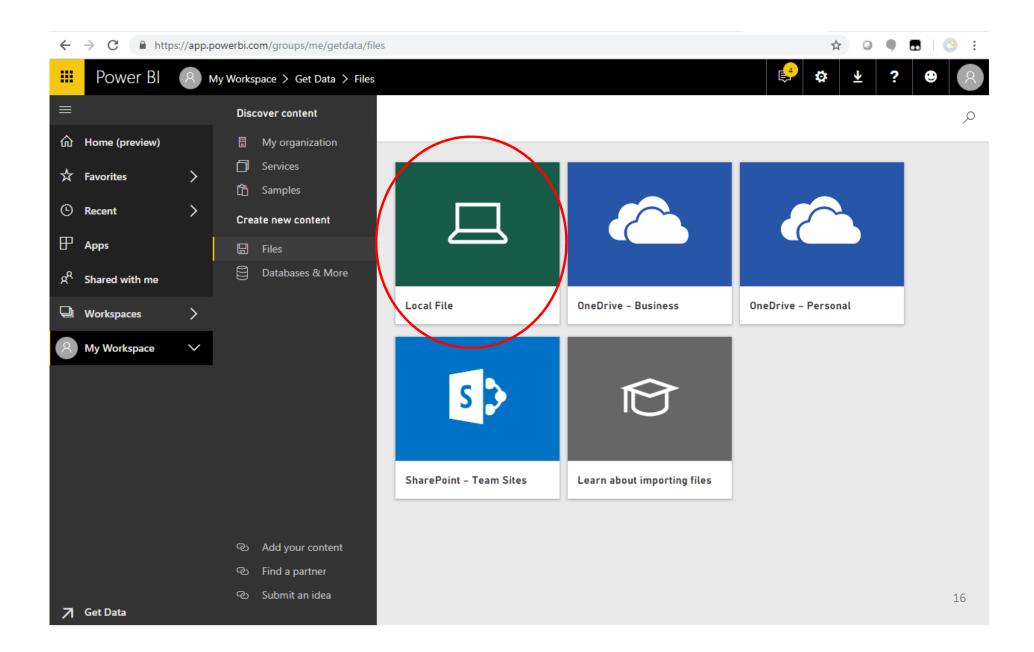
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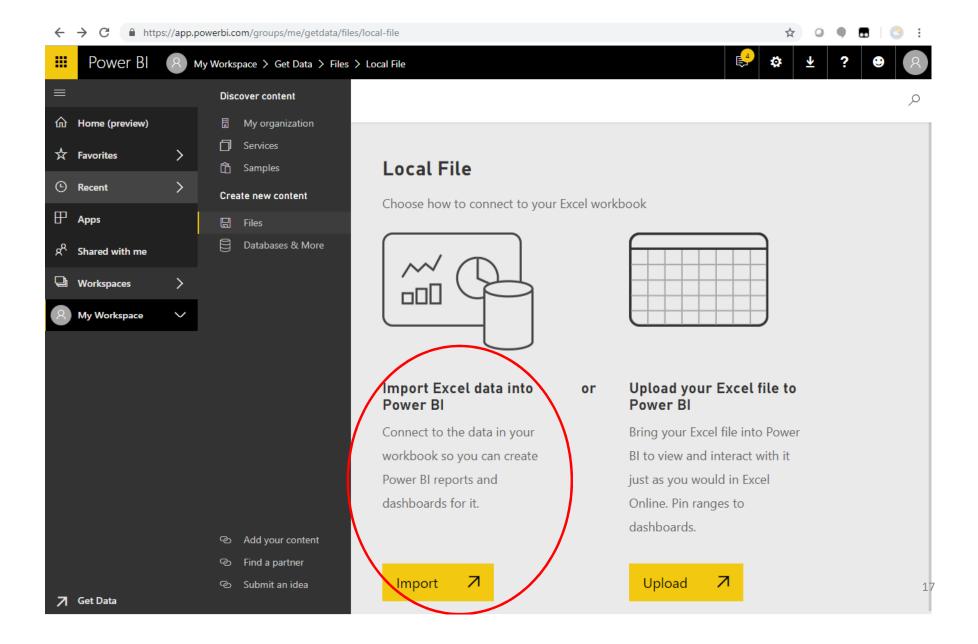
Getting Data for Power BI

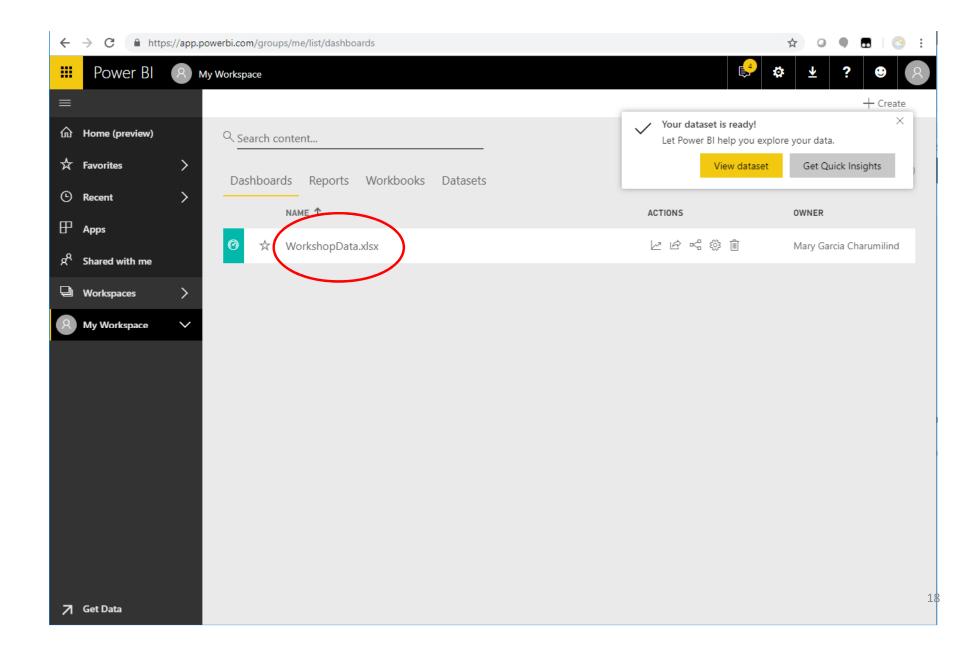
- Excel workbook (.xlsx)
 - Must have tables (Mac or PC) or connections to tables (PC only)
 - If the tables have relationship defined (PC only), they will also exist in Power BI
- CSV

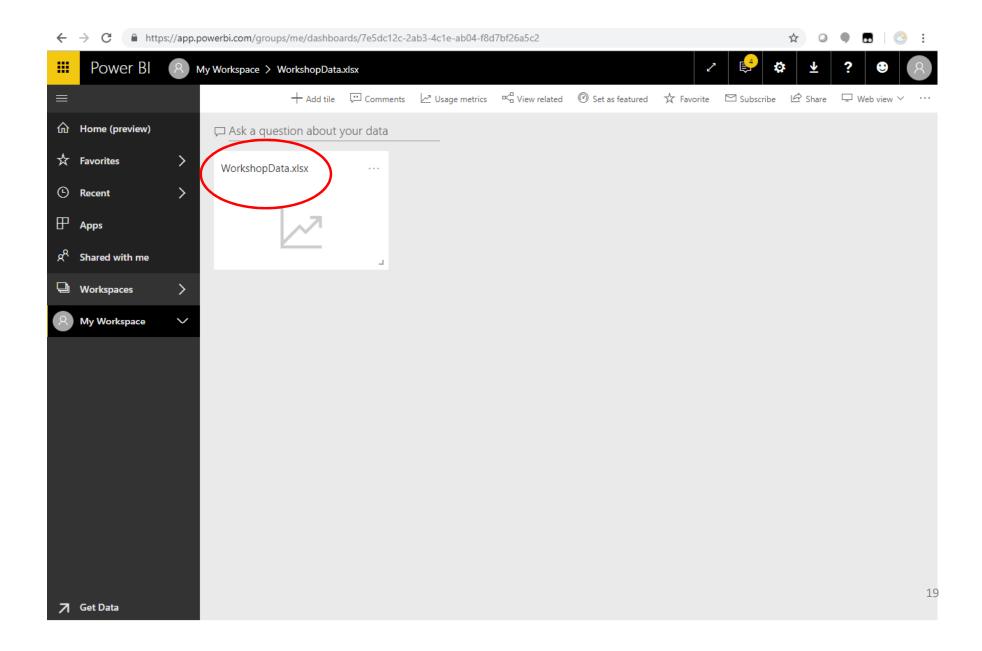












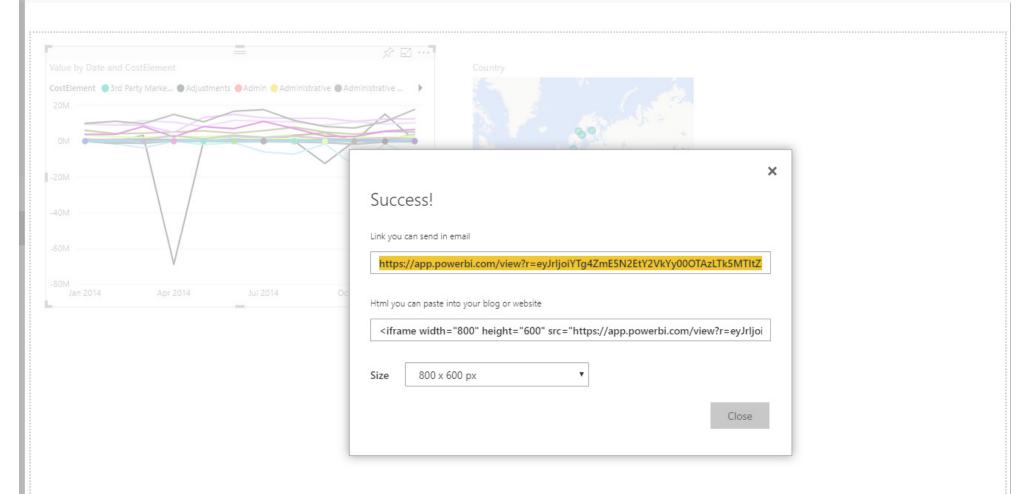
Design the Power BI Report

- Tutorials at <u>https://docs.microsoft.com/en-us/power-bi/guided-</u> <u>learning/visualizations#step-0</u>
 - Guide to viz types: <u>https://www.sqlbi.com/ref/power-bi-visuals-reference/</u>
- Save it! (upper right hand corner of the window)
- To update the data
 - make sure your xlsx file has the same name as before
 - "Get Data" and select it again
 - Click "Replace it" in the alert that says "A dataset with the same name exists"

/ly Workspace > TestExample

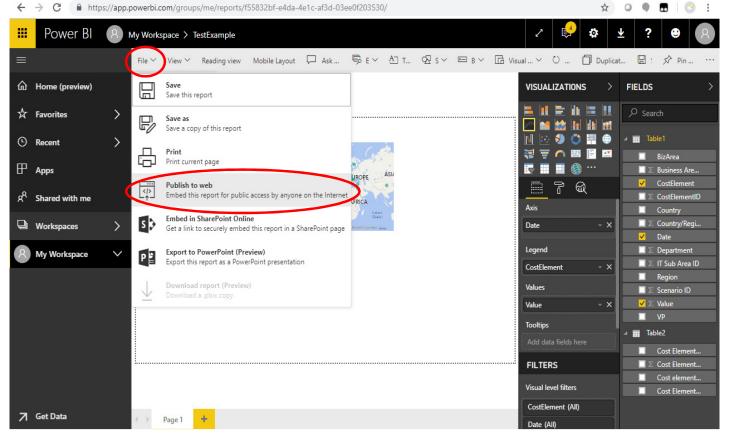
File \checkmark View \checkmark Reading view Mobile Layout

💭 Ask a question 🖷 Explore 🗸 🖓 Text box 🖓 Shapes 🗸 📼 Buttons 🗸 🔂 Visual interactions 🗸 🖒 Refresh



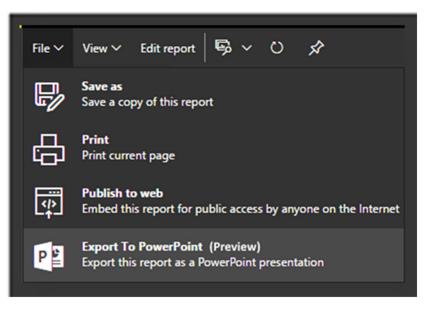
Sharing your Power BI Report

• Option 1: Publish to web – public, interactive.



Sharing your Power BI Report

- Option 2: Export to PowerPoint static images
 - Will show snapshots as default (filters must be saved)



https://docs.microsoft.com/en-us/power-bi/consumer/end-user-preview-features https://powerbi.microsoft.com/en-us/blog/export-power-bi-report-to-powerpoint-preview/ https://docs.microsoft.com/en-us/power-bi/consumer/end-user-powerpoint

Power BI "Cheat Sheet"

https://bit.ly/cheatsheetpbi

Power Query

Tips & Tricks

- Give every step an explanatory name and merge steps of the same type, for better manageability
- Give queries and columns user-friendly names (this is also necessary to utilize O&A). . Make sure that each column in each table has the correct data type. This will make the data model smaller and (as a result) faster
- Remove the columns you are not going to use in your report.
- Maximize the use of Query Folding for faster and more efficient queries. With Query Folding, multiple transformations are merged as one query and then send to the source. If 'View Native Query' is not available, Query Folding has stopped before that step. Structure your queries in folders. For example: Facts, Dimensions, Functions, Misc.
- You can copy/export the complete M code of your Power Queries by selecting and copying one or more queries and paste them in your favorite text-editor (e.g. Notepad++). Dependencies will be included as well (parameters/gueries/functions).
- You can copy and paste Oueries easily between files. Dependencies will be included (parameters/queries/functions), and Data Sources will be automatically liste
- Turn off 'Enable Load' for gueries/tables that you don't need in the Data Model.
- Prefer "reference" over "duplicate" of a guery.
- Turn on the Formula Bar so you get familiar with Power Query (M) code. M is an easy way to quickly make small adjustments. In general, prefer "Import" over "DirectOuery", Unless the amount of data is too large to import, or
- when there are other requirements (like real-time insights). Transform your data by using Phyton and R in the Power BI Query Editor

Code examples (don't forget that Power Query / M is case-sensitive!)

- if T > 0 then A else B
- try A/B otherwise 0
- #table({"X", "Y"}, {{1,2}, {3,4}})
- DateTime.LocalNow()
- Date.From(DateTime.LocalNow())
- Excel.Workbook(Web.Contents("[url]/[filename].xlsx"), null, true)

Resources

- Power Query M Formula Reference: http://bit.ly/PQMReference.
- Notepad++ Power Ouery support by Lars Schreiber: http://bit.ly/POinNotepad

Data Model

- Always use a separate Date table in your data model. Mark it as a Date Table.
- Only use DAX Calculated Columns when it's not possible to create it using Power Query. This implication of the power Query The power Query.
- clarity and manageability of your report as transformations are located where you expect them. Hide columns that are needed but are irrelevant for the user. Quick Tip: use Relationships view to I multiple columns: use SHIFT + DOWN ARROW for selection of columns + SHIFT + F10 for menu + H
- Hide the key at the many side of a many-to-one relation (e.g. [OrderDate] in Revenue table)
- Don't use report/page/visual level filters to secure your data, as users can change filter values! For each measure column in your data model, make a DAX Calculated Measure instead of using the Default Summarization', then hide the original column. This way all measures will have the same icon. And it enables you to easily change the calculation in the future (e.g. adding a filter condition Also, it is easier to reference this measure in other DAX calculations
- Always use the table name when you refer to a column, for example: 'Product'[Category].
- Use DIVIDE() to prevent division by 0, and to improve the speed of your divisions.
- Give measures a prefix (%, #, €).
- Use standard abbreviations like YTD, LY, PY, PP as suffix, to keep the base fields together
- In DAX: (un)comment DAX lines by pressing Alt + Shift + A or CTRL + /, and Shift + Enter for line bre-

Code example:

Tips & Tricks

- STORE SALES = CALCULATE([Sales], Channel[Channel Name] = "STORE")
- SUMX(Orders, Orders[Price] * Orders[Ouantity])
- DIVIDE ([Profit] [Total Sales])
- TOTALYTD ([Total Sales], 'Date'[Date])
- IF ('Date'[Date] > TODAY(), BLANK(), [Total Sales])
- VAR Sales = SUM([SalesAmount]) VAR SalesLastYear = CALCULATE (SUM([SalesAmount]), SAMEPERIODLASTYEAR ('Calendar'[Date RETURN
- IF (Sales, DIVIDE (Sales SalesLastYear, Sales))

Resources

- Increase the readability of your DAX calculations: https://www.daxformatter.com.
- Practical DAX use cases, with incredible explanations: https://www.daxpatterns.com.
- Use DAX Studio to analyze and tune your calculations: http://daxstudio.org.

Data Visualization

Tips & Tricks

Themes & Colors

- Use a theme file (.json) with the colors of your organization. Use a Power BI Template file (.pbit), to bring consistency in the look & feel of reports in your
- organization (e.g. add a default background, add common data sources). Don't use noisy images as a background. They distract from the data.
- Apply colors with a purpose and not because it looks fancy. Consider the interpretation of colors (for
- example: red is usually associated with a negative situation, green with a positive situation). Think about colorblindness (8% of male, 0.6% of women have red-green color blindness).

Report layout

- Put filters on a consistent place on each page for user friendliness and recognition.
- Show the last refresh date of the data model in your report.
- Align graphs and objects. You can use the 'snap to grid' option.
- . will show up in the selection pane (Even if you don't show the title).
- Use the ▲ and ▼ buttons on the Selection Pane, to change the display order of visuals.
- Use drillthrough and tooltip pages to add extra context. Hide drillthrough and tooltip pages from your
 navigation bar. Give the 'back button' extra accent for a clear report navigation. Avoid the use of report/page/visual level filters. The Filter Pane is collapsed by default (hidden).
- Disable visual header for a clean look-and-feel and drill up/down using right click. Create pre-defined view by using bookmarks and assign them to a button. .

Graphs & Visuals

- Prefer graphs over tables for better insights. When you do use tables, apply conditional formatting.
- Think about using relative date filters, such as "Last Month" or "Rolling Year".
- Try to limit the use of decimals.
- When using custom visuals, test the impact on performance of your report. Also check when it was last updated by the developer.
- Check and improve all 'visual interactions'. Prefer cross-filtering over cross-highlighting

Resources

- · Power BI theme generator: https://powerbi.tips/tools/advanced-color-theme-generator.
- Hichert, visualization standards: https://www.hichert.com/resources.
- Visuals-picker: http://extremepresentation.typepad.com/files/choosing-a-good-chart-09.pdf

Miscellaneous

- Edit your report in Power BI Desktop and not in the Service. Making sure there is one golden version. • · The best way to share your Power BI solution with others is using Apps. Prefer to use Security Groups.
- Use a multiple-file-strategy: one file with the Power Queries and Data Model: connect from one or more other files to this data model in the Power BI Service and visualize your reports.
- Note: all files must be in a single Workspace, a restriction that probably will be removed in the future Make sure you are having versioning for your Power BI Desktop files (local OneDrive sync works well). Be careful with Publish to Web. Only use this function when all your data can be out in the open.
- Assume that your data will be publicly available! Be aware that users can also access your data model through the Q&A, Quick Insights and Analyze in
- Excel functions. That's great, but think about data protection using (dynamic) row level security Use the Power BI admin API to get an overview of Power BI content within your tenant and monitor
- content usage by using the Power BI Audit logs. Resources

Tips & Tricks

- Follow these bloggers and influencers for tips, examples and news: Kasper de Jonge, Jeroen ter Heerdt (Dutch Data Dude), Chris Webb, Marco Russo, Alberto Ferrari, Imke Feldmann, Ken Puls, Matt Mason, Ivan Bond, Maxim Zelensky, Ken Russel, Gil Raviy, GuyInACube, Brett Powell, David Eldersveld Paul Turley, Devin Knight, Mellisa Coates, Meagon Longoria, Charles Sterling, Rob Farley, Prathy Kamasani, Rob Collie, Reza Rad, Jason Thomas,
- Follow these sites: https://www.sqlbi.com, https://powerbi.tips, https://guyinacube.com

Need more Power?

Contact us! Send an email to the e-mail address below. We can provide consultancy and off-the-shelve content: Rent a Power BI friend. Fly in a Macawer and get things done (together)!

- Practical training by an experienced Macaw Data & Analytics Consultant, examples:
 O Macaw Power BI Rookie Training, 1 day.
- Macaw Power BI Analyst Training, 3 days. Macaw Power BI Developer Training, 2 days.
- Proof of Value. Shows you the value of Power BI in a showcase, timeboxed approach.
- wer BI Adoption Program. Maximize usage of your reports! Full Power BI implementation. All the above and more! Our experience in a proven approach

Feedback

We'd love to hear from you! Send your feedback to us at: powerbi@macaw.nl







- Use a landing page for easy navigate through the report pages.
- Check if you have given graphs, objects, pages and the whole report a clear and explanatory title, this

Questions?

mgcharumilind@temple.edu

215-204-3208

Office hours: Mon & Tues 12pm-1pm through October, Alter 731