Dashboard in a Day –
Data Modeling and Exploration

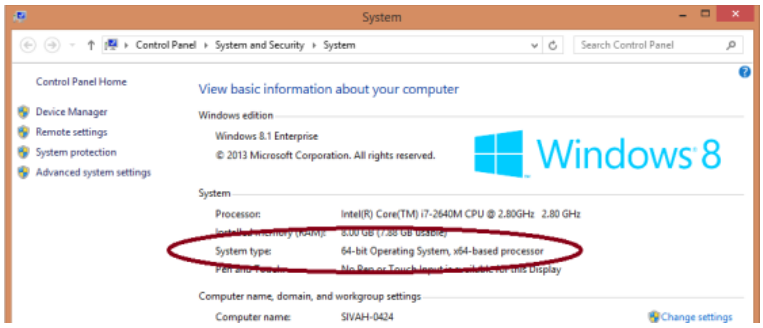
by Power BI Team, Microsoft

Contents

Lab Prerequisites

Following prerequisites and setup must be complete for successful completion of the exercise:

- You must be connected to the internet.
- **Signup for Power BI:** Go to http://aka.ms/pbidiadtraining and sign up for Power BI with a business email address. If you cannot sign up for Power BI, let the instructor know.
- If you have an existing account, please go to http://app.powerbi.com and **Sign in** using your **Power BI Account.**
- At minimum, a computer with 2-cores and 4GB RAM running one of the following version of Windows: Windows 8 / Windows Server 2008 R2, or later.
- Microsoft Power BI Desktop requires Internet Explorer 10 or greater.
- Verify if you have 32-bit or 64-bit operating system to decide if you need to install the 32-bit or 64-bit applications.
    - Search for computer on your PC, right click properties for your computer.
    - You will be able to identify if your operating system is 64 or 32 bit based on "system type" as shown below.



- **Download the Power BI Content:** Create a folder called **DIAD** on the C drive of your local machine. Copy all contents from the folder called **Dashboard in a Day Assets** to the **DIAD** folder you just created (C:\DIAD).
- **Download and install Power BI Desktop** using any one of the options listed below:
    - If you have Windows 10, use Microsoft App Store to download and install Power BI Desktop app.
    - Download and install Microsoft Power BI Desktop from http://www.microsoft.com/en-us/download/details.aspx?id=45331.
- **Download and install Power BI Mobile App on your mobile device**
    - If you are using an Apple product download and install the Microsoft Power BI Mobile app from the Apple store or this link https://apps.apple.com/us/app/microsoft-power-bi/id929738808
    - If you are using an Android product download and install the Microsoft Power BI Mobile app from the Google Play store or this link https://play.google.com/store/apps/details?id=com.microsoft.powerbim

Document Structure

This document is lab 02 of 05 labs in total. The document structure and introduction section can be found in lab 01.

The document flow is in a table format. On the left panel are steps the user needs to follow and in the right panel are screenshots to provide a visual aid for the users. In the screenshots, sections are highlighted with red boxes to highlight the action/area user needs to focus on.

NOTE: This lab is using real anonymized data and is provided by ObviEnce LLC. Visit their site to learn about their services: www.obvience.com .
This data is property of ObviEnce LLC and has been shared for the purpose of demonstrating Power BI functionality with industry sample data. Any uses of this data must include this attribution to ObviEnce

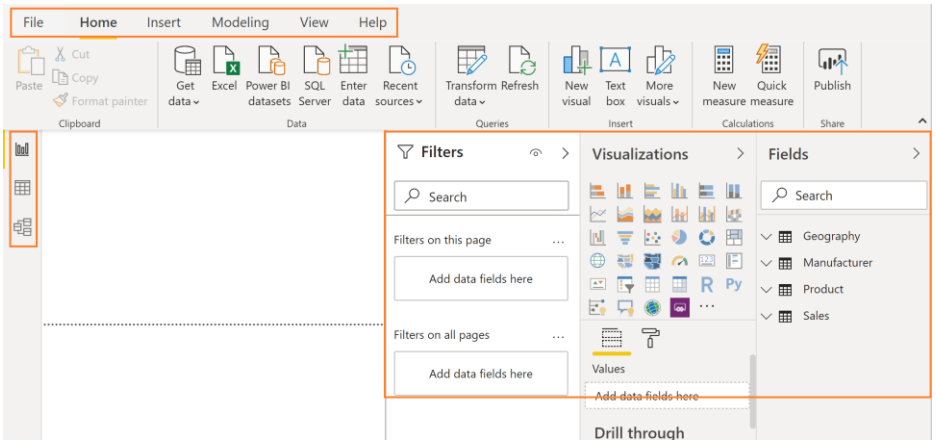
Power BI Desktop – Data Modeling and Exploration

In this section, we will learn the key parts of the Power BI desktop, to model and explore the data and build visuals.

Power BI Desktop - Layout

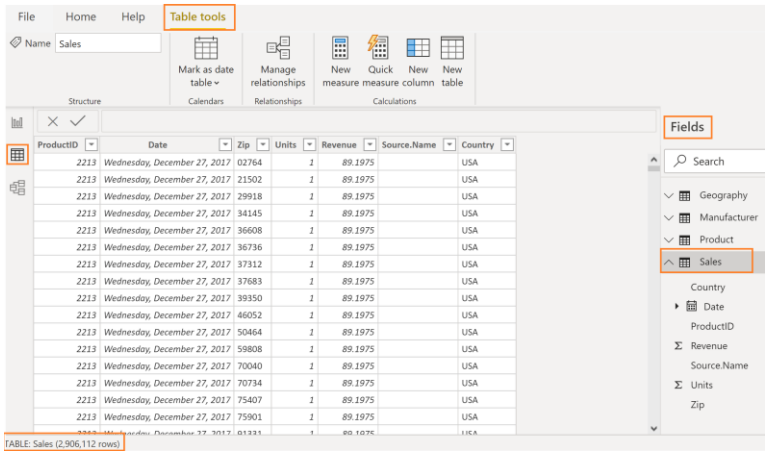
You will land on the main **Power BI Desktop** window. Let's get familiar with the distinct sections available in the Power BI Window.

1. On the top, you see the **Home** tab where the most common operations you perform are available.
2. **View** tab has options to format the page layout.
3. **Modeling** tab in the ribbon enables additional data modeling capabilities like adding custom columns and calculated measures.
4. **Help** tab provides self-help options like guided learning, training videos and links to online communities, partner showcase and consulting services.
5. On the left side, you have three icons, **Report, Data and Model**. If you hover over the icons, you can see the tool tips. Switching between these allows you to see the data and the relationships between the tables.
6. The center **white space** is the canvas where you will be creating visuals.
7. **Visualizations** panel on the right allows you to select visualizations, add values to the visuals and add columns to the axes or filters.



8. The **Fields** window on the right panel, is where you will see the list of tables which were generated from the queries. Click the ▼ icon next to a table name to expand to the field list for that table.
9. Click on the Data icon. Expand **Sales** table in the **Fields** as shown in the figure

Scroll up and down to notice how fast you can navigate **through ~ 3 Million rows**.



10. Click on the **Model** icon on the left panel of Power BI Desktop.

You will see the tables you have imported along with some Relationships. The Power BI Desktop automatically infers relationships between the tables.

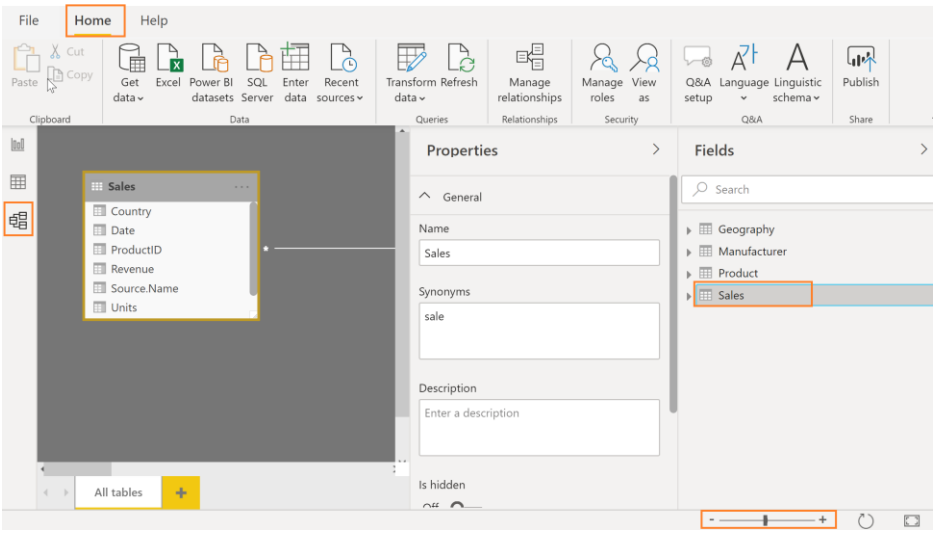
- A relationship is created between Sales and Product tables using ProductID column.
- A relationship is created between Product and Manufacturer tables using ManufacturerID column.

Power BI supports 1 to many, 1 to 1 and many to many types of relationships between the tables.

In this lab we will be using 1 to many type of relationship. This is the most common type of relationship between tables. This means one of the tables involved in the relationship should have a unique set of values.

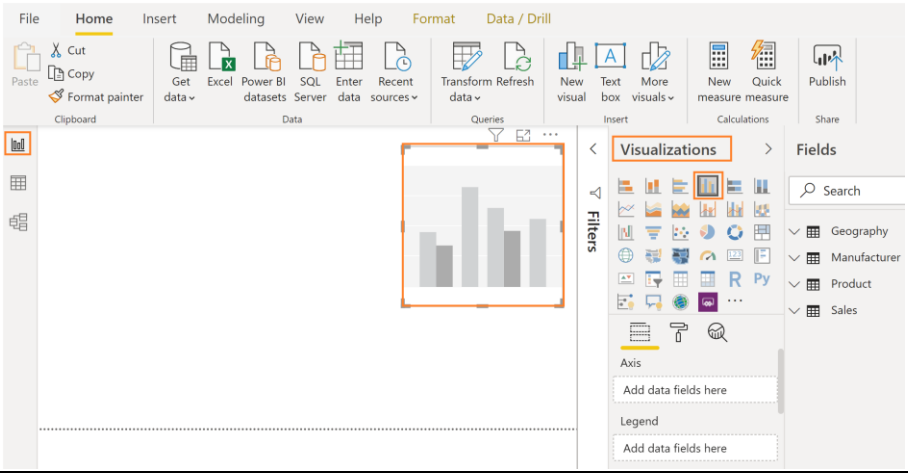
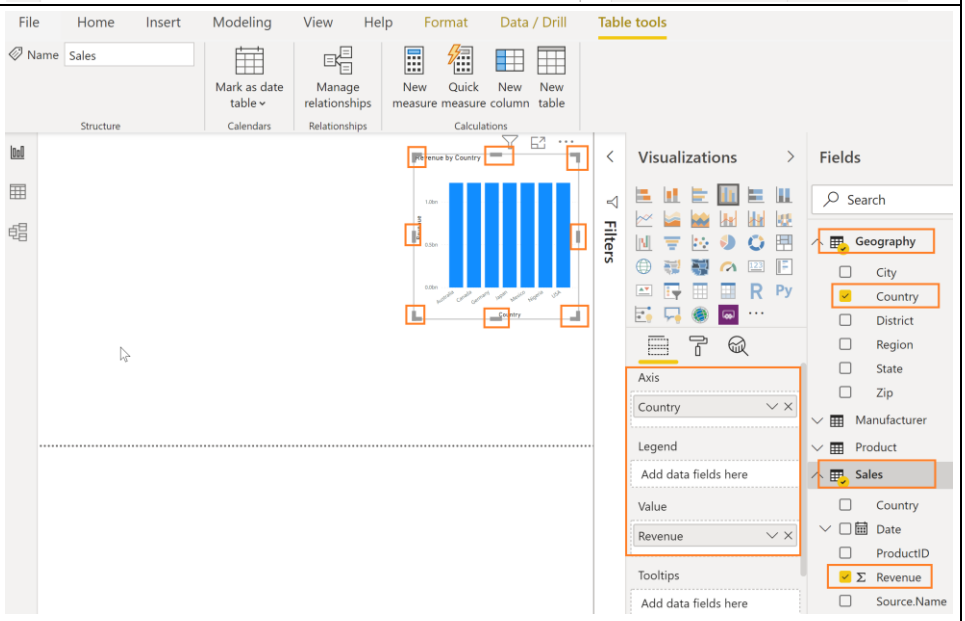
Notice there is no relationship between the Geography and Sales tables. If you want to explore sales data across state or city or country, you will need to setup the relationship between the Geography and Sales tables. You will create the relationship shortly.

Note: Tables may not appear as shown in the figure. You can zoom in and out of the Relationships page by dragging the



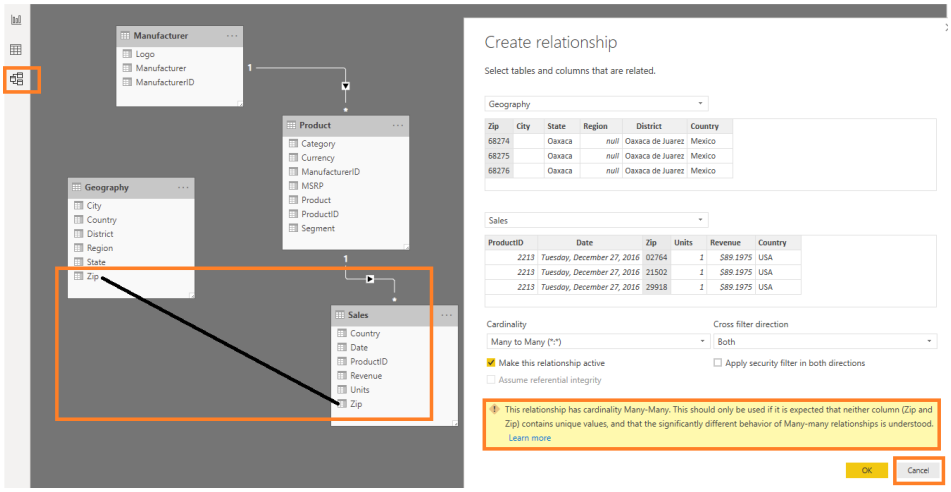
zoom slider in the bottom right corner of the window. Also, if want to ensure you are seeing all the tables, use the fit to page icon:  . Drag and move the tables to appear as shown in the figure.	

Power BI Desktop – Data Exploration

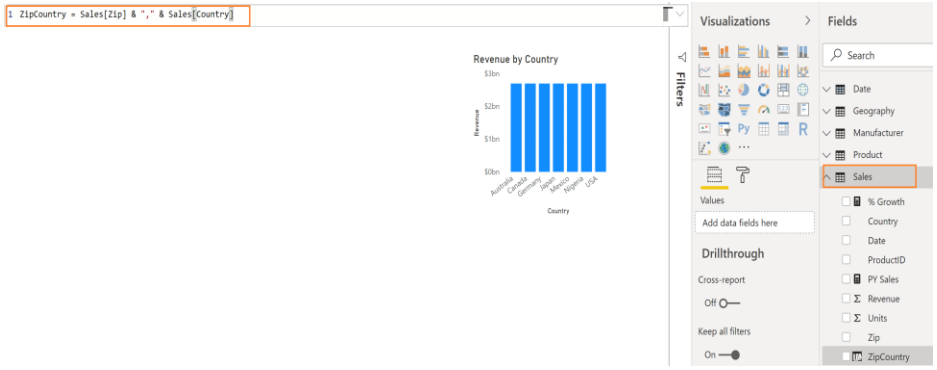
We loaded data from different countries. So, let's start with analyzing sales by country. 11. Click on the **Report** icon on the left panel to navigate to the Report view. 12. Select the **Clustered column chart** visual in **Visualizations** as shown in the screenshot.	
13. From the **FIELDS** section, expand **Geography** table and click the checkbox next to the **Country** field. 14. From the **FIELDS** section, expand **Sales** table and click the checkbox next to the **Revenue** field. 15. **Resize** the visual as needed by dragging the edges. Notice revenue of each country is the same. This is because there is no relationship between Sales and Geography tables. Let's create one. **Note**: You now need to set up the correct relationship between these tables. To create a relationship between the two tables we need a "joining" or "relating" column.	

16. Click on the **Model** icon on the left panel to navigate to the Relationship view.
17. Sales data is by Zip code. Hence, we need to connect Zip column from Sales table with Zip column in Geography table. You can do this by dragging the **Zip** field in **Sales** table and connecting the line with **Zip** field in **Geography** table.

You will notice Create relationship dialog opens with a warning message at the bottom stating the relationship has a many-many cardinality. The reason for the warning is that we don't have unique Zip values in Geography. This is because multiple countries could have the same Zip code. Let's concatenate Zip and Country columns to create a unique value field.
18. Select **Cancel** in Create relationship dialog.

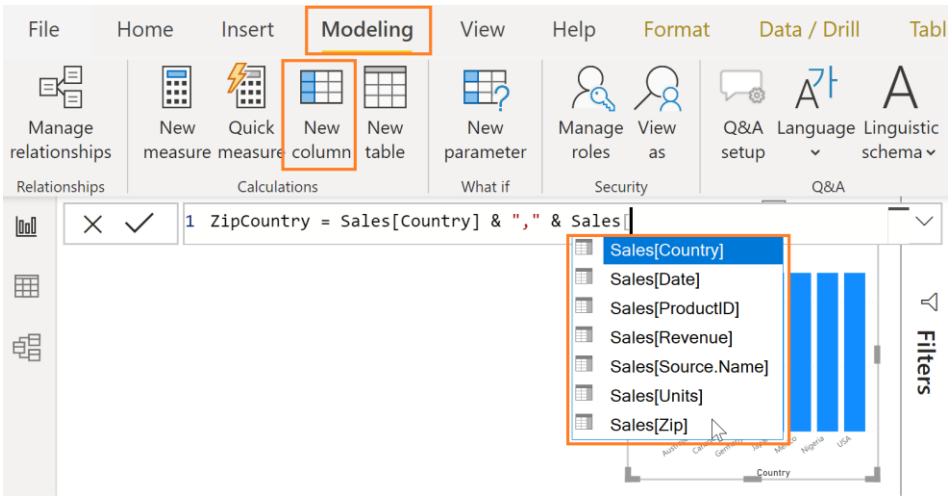


We need to create a new column in both the Geography table and the Sales table that combines "Zip" and "Country". Let us start by creating a new column in the Sales table.
19. Click on the **Report** icon on the left panel to navigate to the Report view.
20. In the **Fields** section, click on the ellipsis next to **Sales** table. Select "**New Column**" as shown in the figure.
You will see a formula bar appear as shown in the screenshot to help create this new column.
21. We can combine or concatenate the Zip and Country columns into a new column called ZipCountry separated by a comma. Let us create this column called **ZipCountry** using the following calculation in the editor.



IMPORTANT!

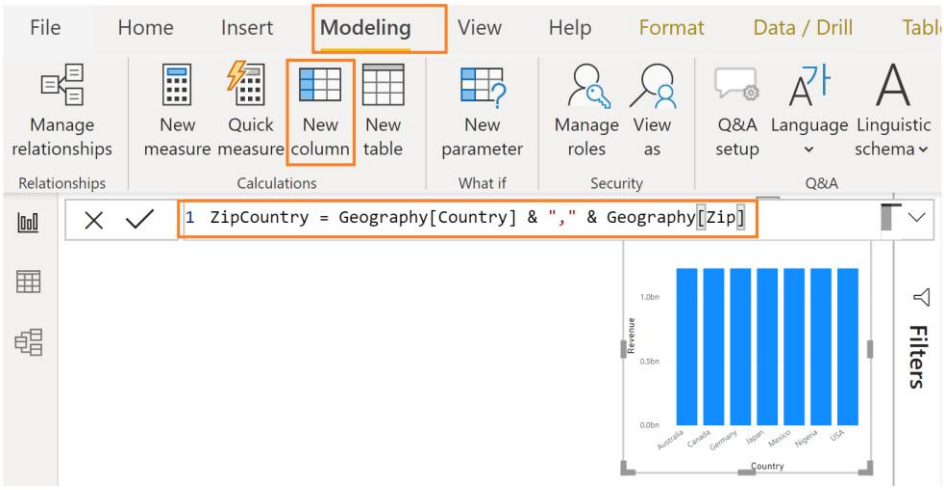
If you get an error creating a new column here, make sure your Zip column is the Text Data Type.

ZipCountry = Sales[Zip] & "," & Sales[Country] 22. Once you are done entering the formula press Enter or click in the check mark on the left side of the formula bar.	
You will notice that as you type the expression the Power BI desktop guides you to choose the right columns using a Technology called Intellisense. As you type half way through you can select the right column by double clicking on it using your mouse or by continuing to hit tab until you see the correct name. The language you used to create this new column is called Data Analysis Expression (DAX) which is very similar to writing expressions in Excel where you are concatenating the two columns (Zip and Country) in each row by using the "&" symbol. You will see a new column ZipCountry in Sales table. The icon with a (fx) indicates you have a column that contains an expression, also referred to as calculated column. You can also create a new column by selecting the table and then clicking on **Modeling -> New Column** from the ribbon. Let us use this method to create a "ZipCountry" column in the Geography table.	

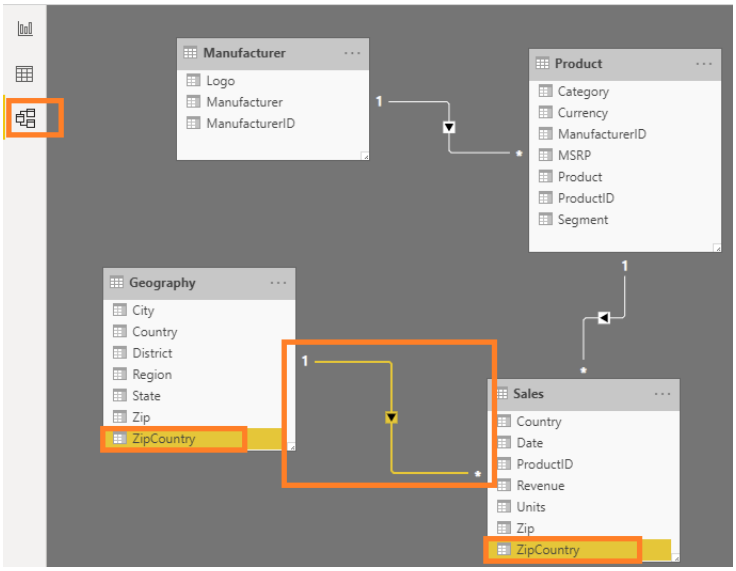
23. From **Fields** section, select **Geography** table and from the ribbon select **Modeling -> New Column** as shown in the figure.
24. Formula bar appears. Enter the following DAX expression in the formula bar:

ZipCountry = Geography[Zip] & "," & Geography[Country]

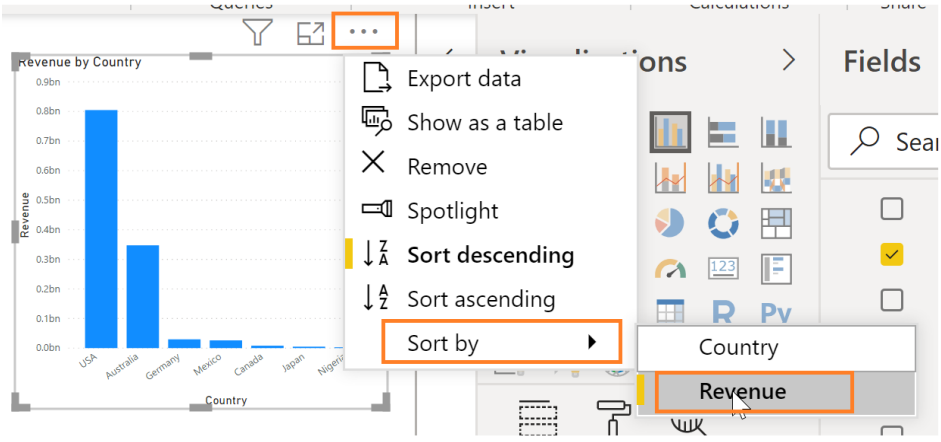
You will see a new column ZipCountry in Geography table. The final step is to setup the relationship between the two tables using the newly created "ZipCountry" columns in each of these tables.

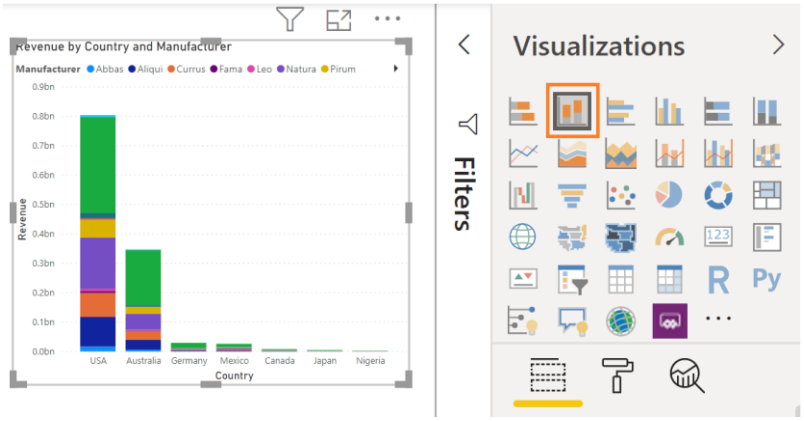
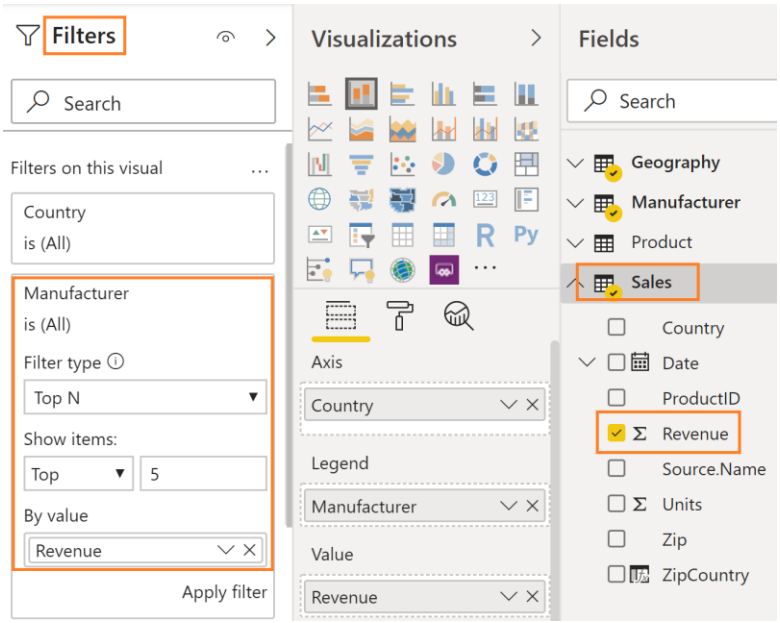


25. Click on the **Model** icon on the left panel to navigate to the Relationship view.
26. Drag **ZipCountry** field from **Sales** table and connect it to **ZipCountry** field in **Geography** table.
Now we have successfully created a relationship. The number 1 next to Geography indicates it is on the one side of the relationship and * next to Sales indicates it is on the many side of the relationship.



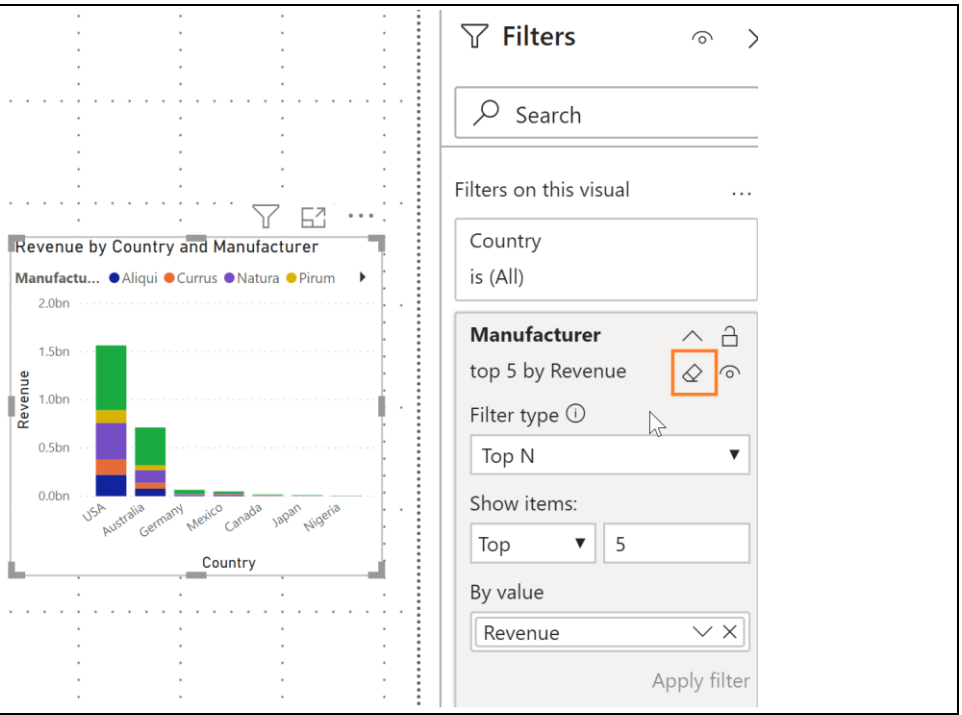
27. Click on the **Report** icon on the left panel to navigate to the Report view.
Notice the clustered column chart we created earlier. It shows different sales for each country. USA has the most sales followed by Australia and Japan. By default, it is sorted by Revenue.
28. Click on the **ellipsis** on the top right corner of the visual.
Notice there is option to Sort by Country as well.



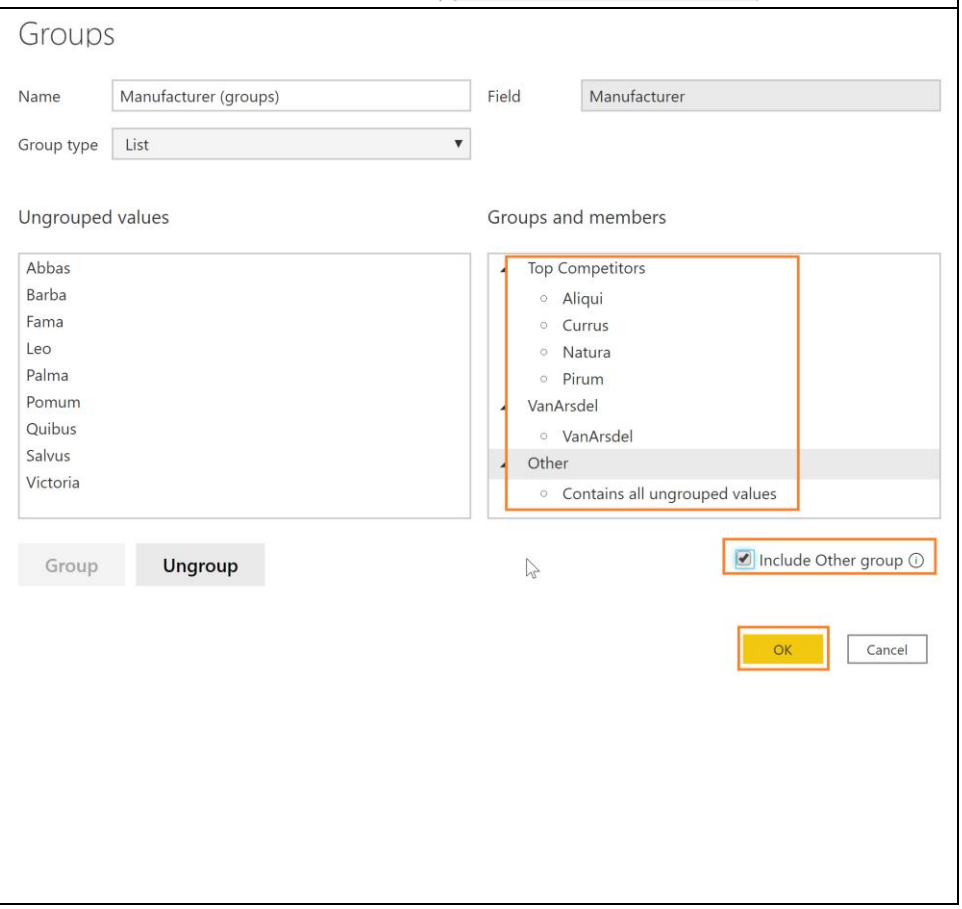
29. Select the Clustered column chart from the **VISUALIZATIONS** section select **Stacked column chart** visual. 30. **Resize** the visual as needed. Now we can figure out the top manufacturers by country. It will be nice to narrow down to the top 5 competitors to better analyze the data. Try different visuals to see which chart explains the data the best.	
31. With Stacked column chart selected 32. In the Filters pane, expand **Manufacturer**. 33. From the **Filter Type** drop down select **Top N**. 34. Enter **5** in the text box next to Top. 35. From **Sales** table, drag and drop **Revenue** field to **By value** section. 36. Select **Apply filter**. Notice now the visual is filtered to display the Top 5 manufacturers by Revenue. We see that VanArsdel has higher percentage of sales in Australia compared to other countries.	

We are interested in the top 5 competitors by revenue. Let's group them so we don't have to add a filter in every visual.
Before we do that let's remove the Top 5 visual level filter.

37. With Clustered column chart selected
38. Hover over and select the **Clear filter** icon (erase) next to Manufacturer field in the Filters Pane.

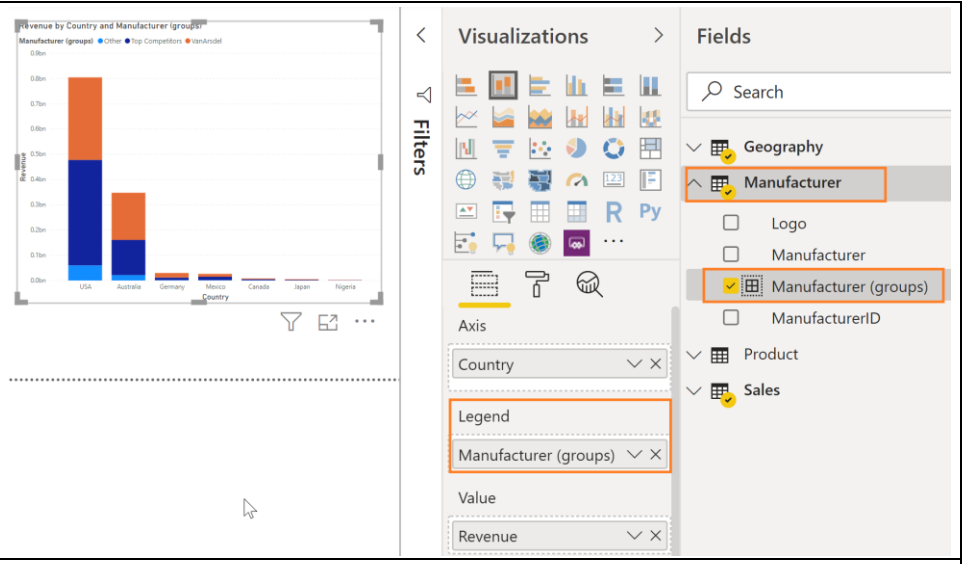


39. From the **FIELDS** section, right click on the **Manufacturer** field name (note: do not check the checkbox) from **Manufacturer** table.
40. Click **Add Group**
41. In the Ungrouped values section, using Ctrl key, select **Aliqui, Currus, Natura and Pirum**.
42. Select **Group** button. Notice a new group is added in the Groups and members section.
43. Double click the newly created group and **rename** it to **Top Competitors**.
44. Select **VanArsdel** from the Ungrouped values section and select **Group** button to create **VanArsdel Group**.
45. Select the check box **Include Other group**. This will create another Other group which will include all the other manufacturers.
46. Select **OK** to close Groups dialog.



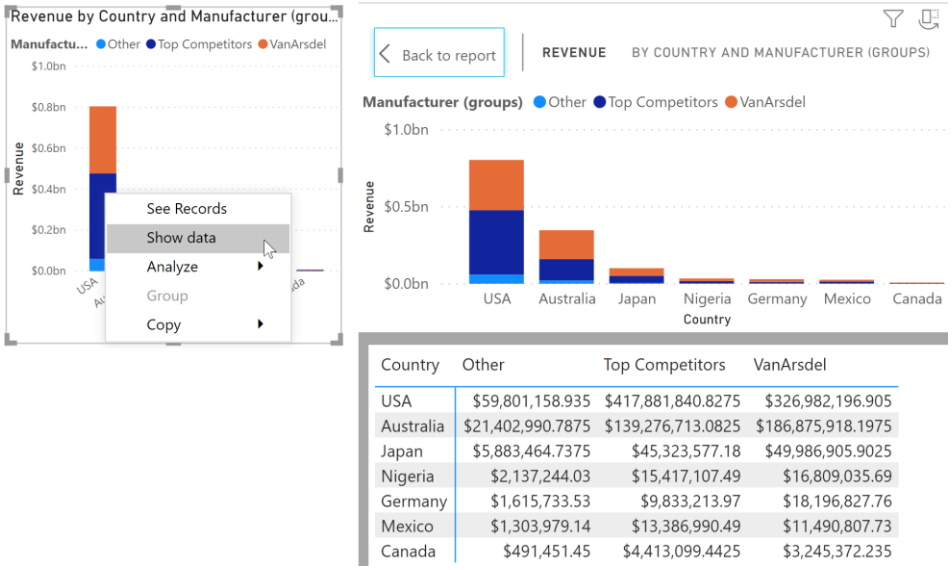
47. With the Stacked column chart selected, click on the **X** next to **Manufacturer** in the **Legend** section. This will remove Manufacturer.
48. From the **FIELDS** section, drag the newly created **Manufacturer (groups)** to the Legend section.

Now we can clearly see that VanArsdel has nearly 50% share in Australia.

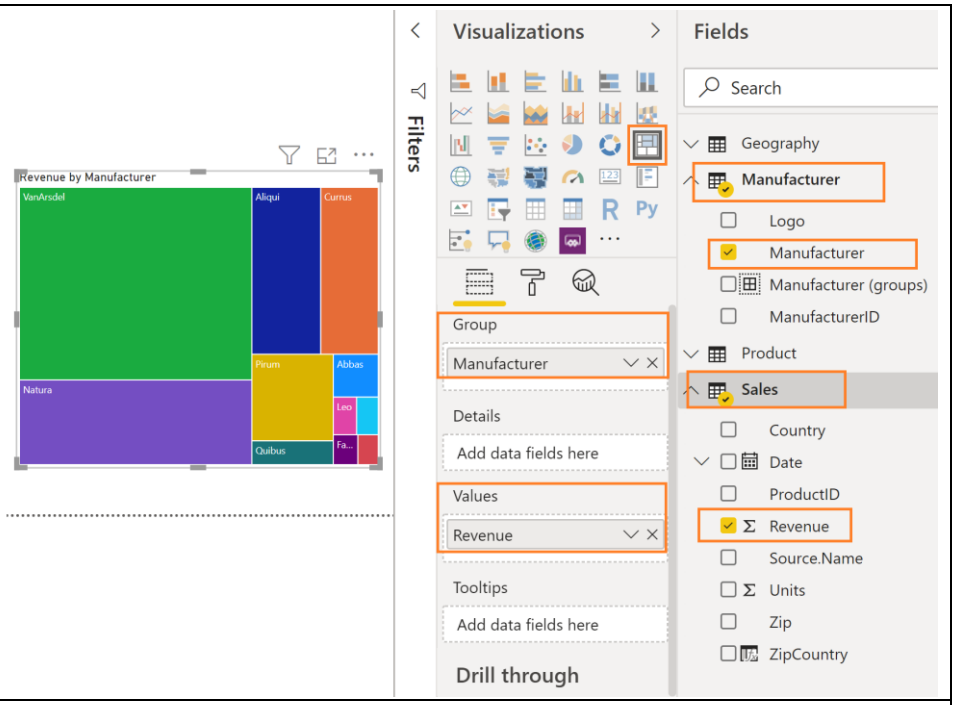
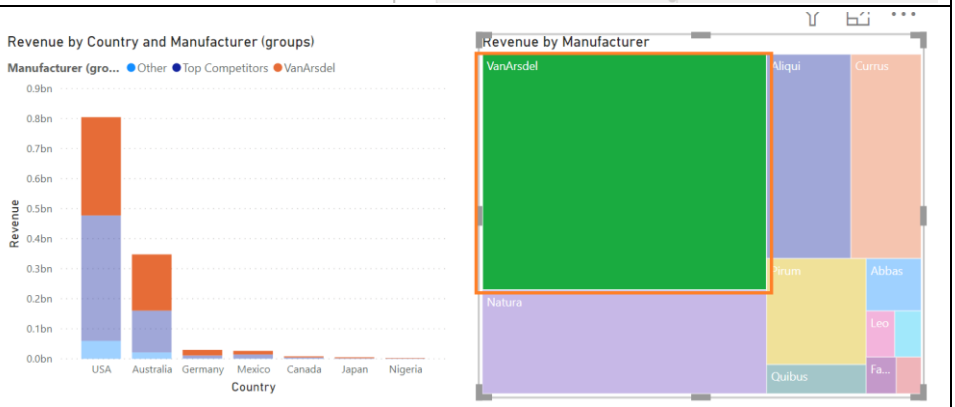


49. Hover over one of the columns and **right click**.
50. Select **Show Data**.
You will be in Focus mode with the chart displayed on top and the data displayed below. It is easy to see that VanArsdel has a big percent of the Australian market.
51. You can use the icon on the top right corner to switch to **vertical layout**. In this layout you will view the chart on the left and data on the right panel.
52. Select **Back to Report** to go back to Report canvas.

You can use similar steps to **See Records** as well

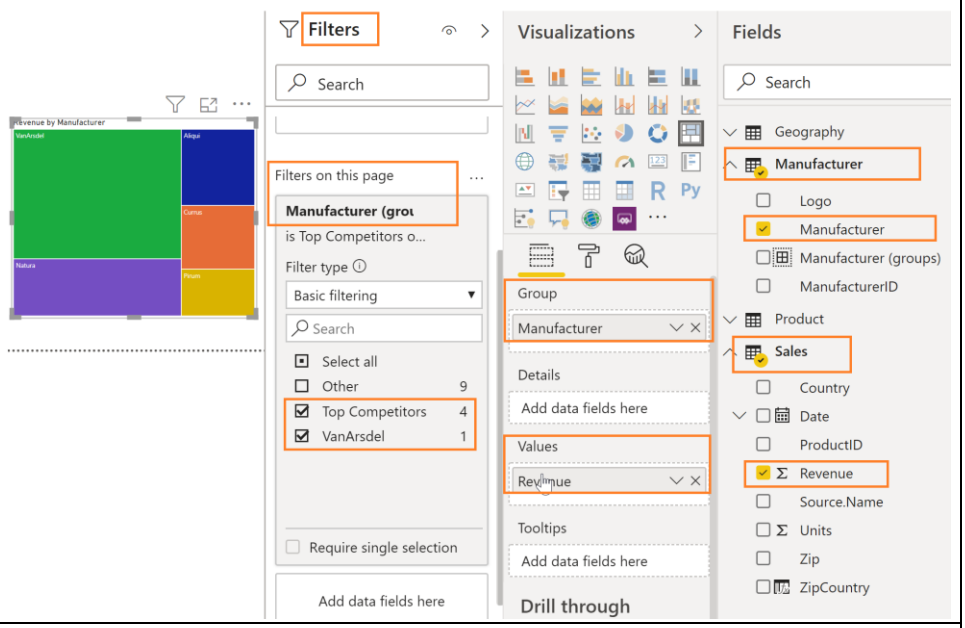


Country	Other	Top Competitors	VanArsdel
USA	$59,801,158.935	$417,881,840.8275	$326,982,196.905
Australia	$21,402,990.7875	$139,276,713.0825	$186,875,918.1975
Japan	$5,883,464.7375	$45,323,577.18	$49,986,905.9025
Nigeria	$2,137,244.03	$15,417,107.49	$16,809,035.69
Germany	$1,615,733.53	$9,833,213.97	$18,196,827.76
Mexico	$1,303,979.14	$13,386,990.49	$11,490,807.73
Canada	$491,451.45	$4,413,099.4425	$3,245,372.235

Let's create Revenue by Manufacturer visual. 53. Click on the white space in the canvas. From the **FIELDS** section, click the **checkbox** next to **Revenue** field in **Sales** table. 54. From the **FIELDS** section, click the **checkbox** next to **Manufacturer** field in **Manufacturer** table. 55. From the **VISUALIZATIONS** section, select **Treemap** visual. We have Revenue by Manufacturer. Let's figure out the interaction between the Stacked column chart and the Treemap visuals.	
56. Select **VanArsdel** in the **Treemap** and notice Stacked column chart is filtered. This confirms that VanArsdel has a big percent of the Australian market. 57. To **remove the filter** select VanArsdel again. The interaction between visuals is called **cross filtering**.	

Previously we added Top 5 Visual level filter. Let's add a filter to the Page level, so we are working with the Top Competitors and VanArsdel and filter out the other manufacturers.
Page level filters apply to all the visuals on the page whereas Visual level filter applies to a visual.

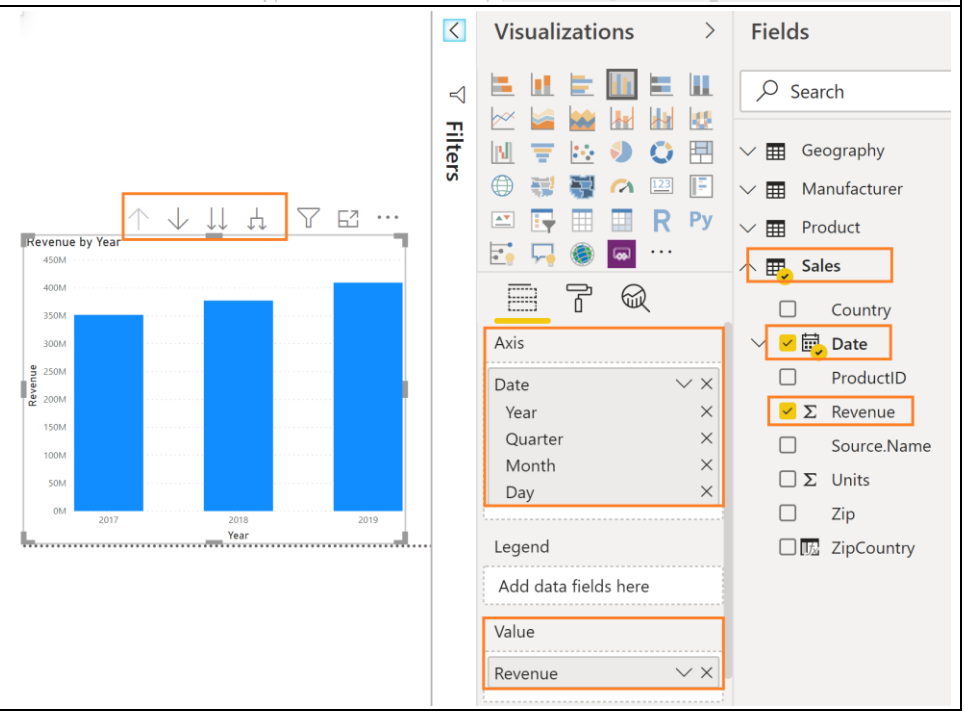
58. From **FIELDS** section, drag **Manufacturer (groups)** from **Manufacturer** table to the **Filters on this page** box in the **Filters Pane**
59. Select **Top Competitors** and **VanArsdel**.



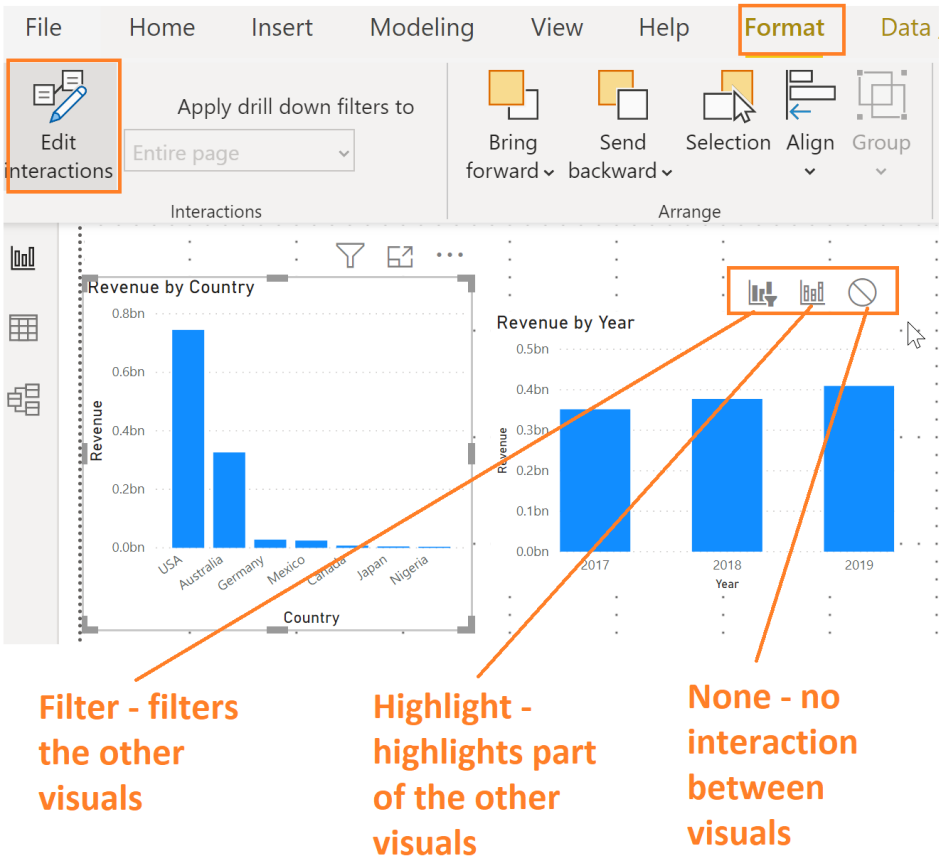
Let's add a visual that will provide sales information over time.

60. Click on the white space in the canvas.
61. Click the checkbox next to the **Date** field in **Sales** table. Notice a Date Hierarchy is created.
62. Click the checkbox next to the **Revenue** in **Sales** table field.

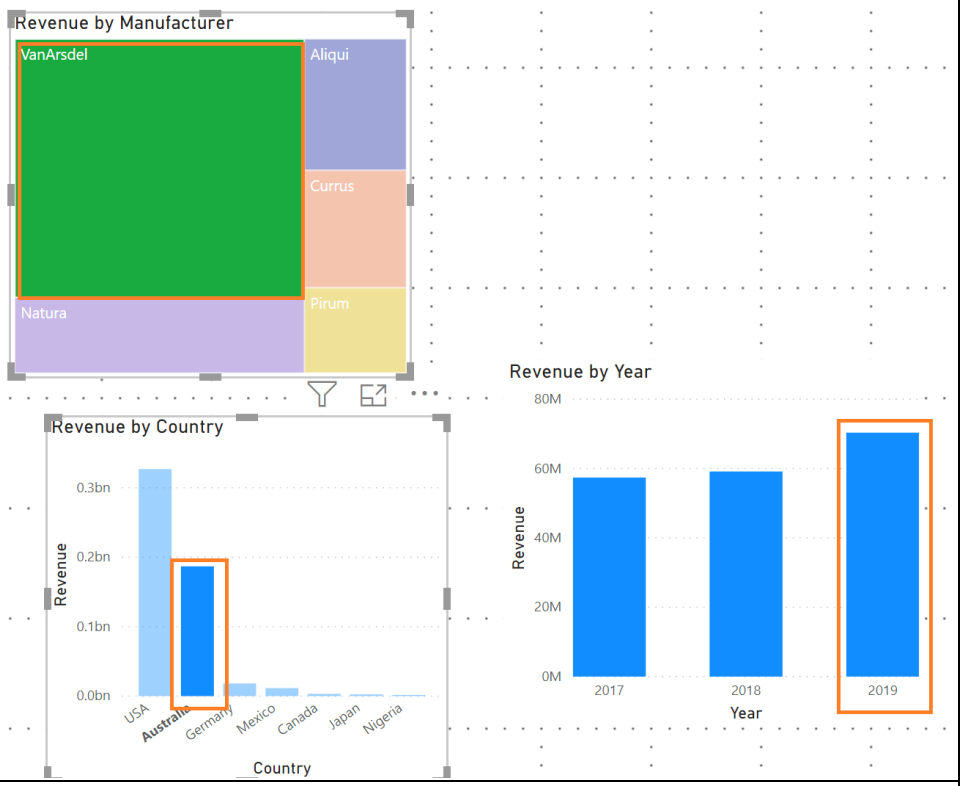
Notice a Clustered column chart is created. Also notice in the **Axis** section, a date hierarchy is created. There are arrows on the top bar of the chart. This is used to navigate through the hierarchy.

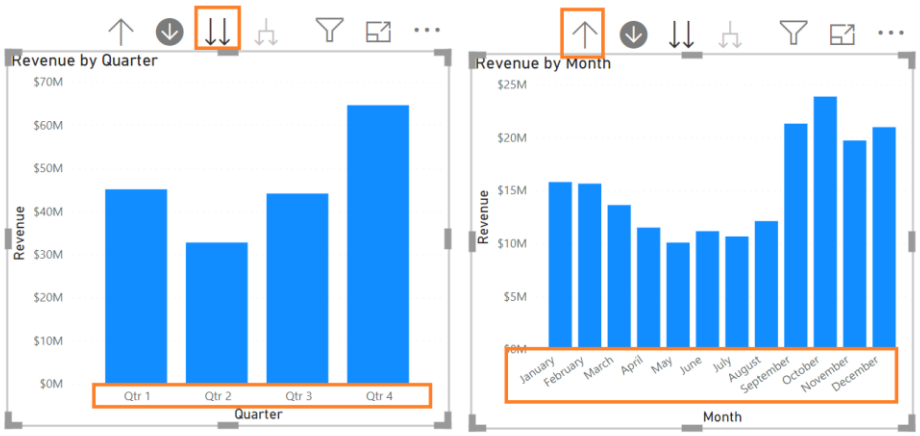
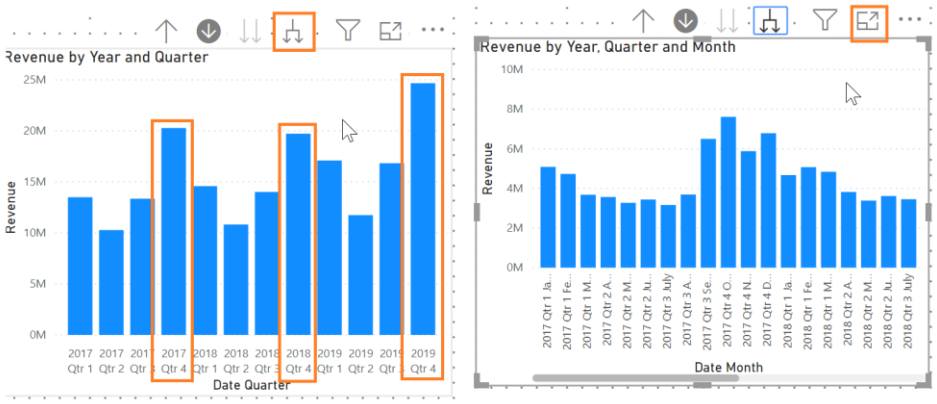


63. Click on **Australia** column in the **Revenue by Country** visual.
64. With the Revenue by Country visual selected, from the ribbon select **Format -> Edit Interactions**.
Notice on the top right of the other two visuals we see new icons with the highlight icon selected.
65. Select **filter icon** for **both visuals**.
Notice now in both Revenue by Year and Revenue by Manufacturer data is filtered for Australia.

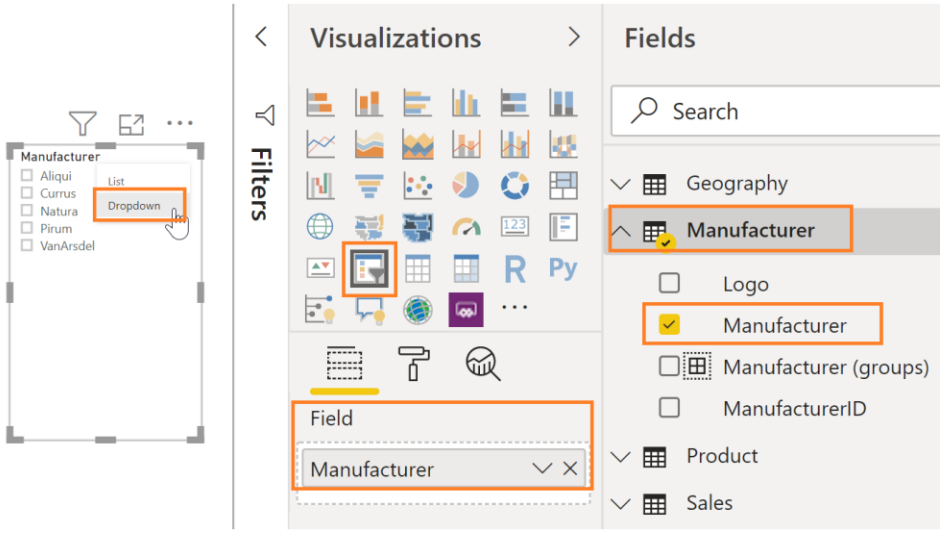
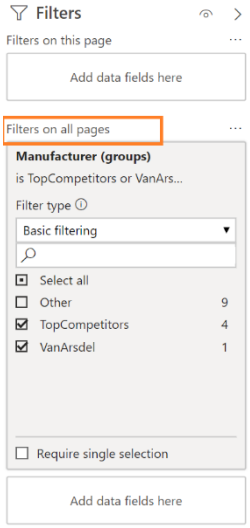


66. Now select **Revenue by Year** visual.
67. Select **filter icon** on the other **two visuals**.
68. Similarly, select **Revenue by Manufacturer** visual and select **filter icon** on the other **two visuals**.
Once you are done, all the visuals should be in filter mode.
69. With the **Revenue by Manufacturer** visual selected, from the ribbon select **Format -> Edit Interactions** to remove the icons.

We had already noticed that VanArsdel has a big share of the market in Australia. Let's check how VanArsdel has done over time in Australia. 70. Click on **VanArsdel** in the **Revenue by Manufacturer** visual. 71. **Ctrl+Click Australia column in Revenue by Country** visual. Now we have filtered the charts by both VanArsdel and Australia. We see a spike in 2019 sales for VanArsdel in Australia.	
We are intrigued by the spike in 2018 for VanArsdel in Australia. Let's investigate further. 72. Click on **VanArsdel** in the **Revenue by Manufacturer** visual. 73. **Ctrl+Click Australia column in Revenue by Country** visual 74. Select the **down arrow** on the **top right** corner of the **Revenue by Year** visual. This enables drill down capability. 75. Select **2019 column in Revenue by Year** visual. Notice you have drilled down to quarter level of 2018. There is a big spike in the 4th quarter. Interesting let's dig further…	

76. Click on the **double arrow icon** on the **top right** of **Revenue by Year** visual. This drills down to the **next level of the hierarchy** which is month. Looks like sales picked up in September and October and is holding steady since then. Ok this is interesting. Now is this a yearly trend. Let's check? 77. Click on the **up arrow icon** on the **top right** of **Revenue by Year** visual to drill up to **Quarter level**. 78. Click on the **drill up icon** again to go up to **Year level**.	
79. Click on the **split arrow icon** on the **top right** of **Revenue by Year** visual. This expands down to the **next level of the hierarchy** which is quarter for all the years. Notice 4th quarter sales have always been high but in 2019 there is a bigger spike in the 4th quarter. 80. Let's expand down to the month level. Click on the **split arrow icon** on the **top right** of **Revenue by Year** visual. This expands down to the **next level of the hierarchy** which is month for all the years. There is a lot of information on the visual and we must scroll left and right to compare.	

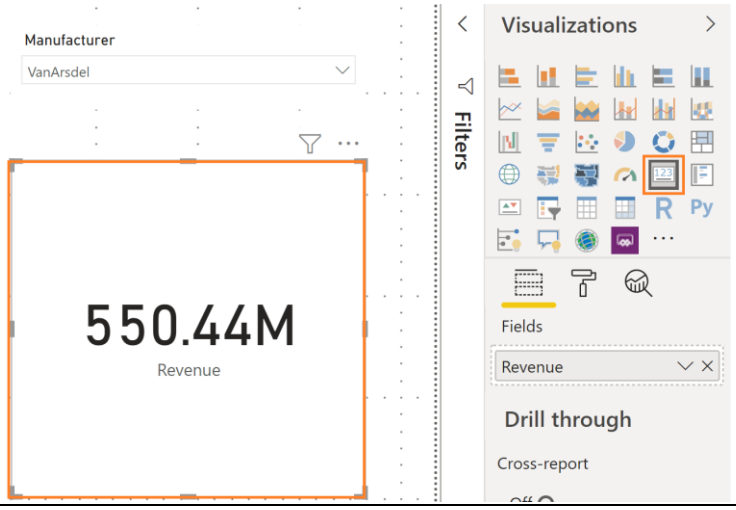
Power BI Desktop – Data Exploration Continued

Let's add a slicer so we can filter manufacturers. 1. Click on the white space in the canvas. From the **FIELDS** section, click the checkbox next to **Manufacturer** field in **Manufacturer** table**.** 2. From the **VISUALIZATIONS** section select **Slicer** visual. 3. You will see a list of Manufacturers. **Select VanArsdel** and notice all the visuals are filtered based on your selection. 4. **Hover** over the top right corner of the visual and click on the **down arrow**. Notice you have the option to change the slicer from a list to a drop down. 5. Select **Dropdown**. 6. Select **VanArsdel** from the dropdown.	
7. Select **Top Competitors** and **VanArsdel** from the manufacturer filter Note that there is a box for **Filters on all pages** in the Filters pane. If you have duplicate pages this is how you sync a filter for the whole document	

We use the Manufacturer slicer to analyze one manufacturer at a time. Notice when we do this, Revenue by Manufacturer Treemap visual is not the best representation of the data. Let's change it.

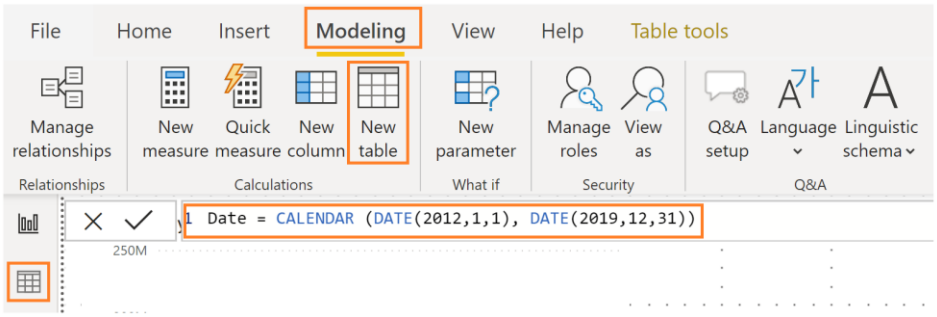
8. Select **Revenue by Manufacturer Treemap** visual.
9. From the **VISUALIZATIONS** section, select **Card** visual.

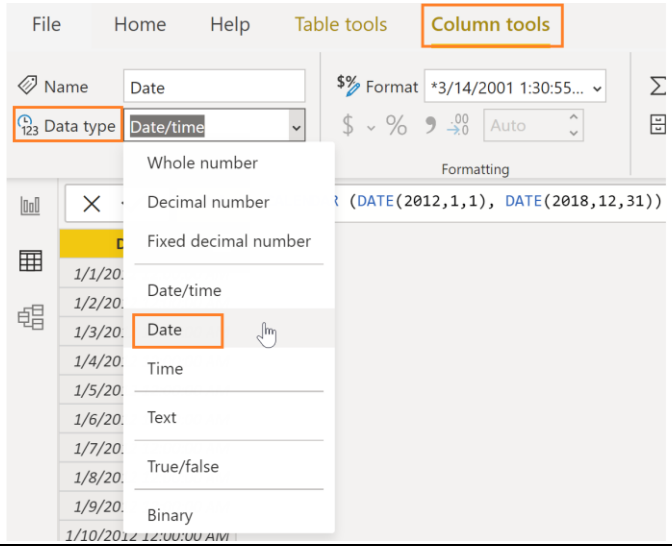
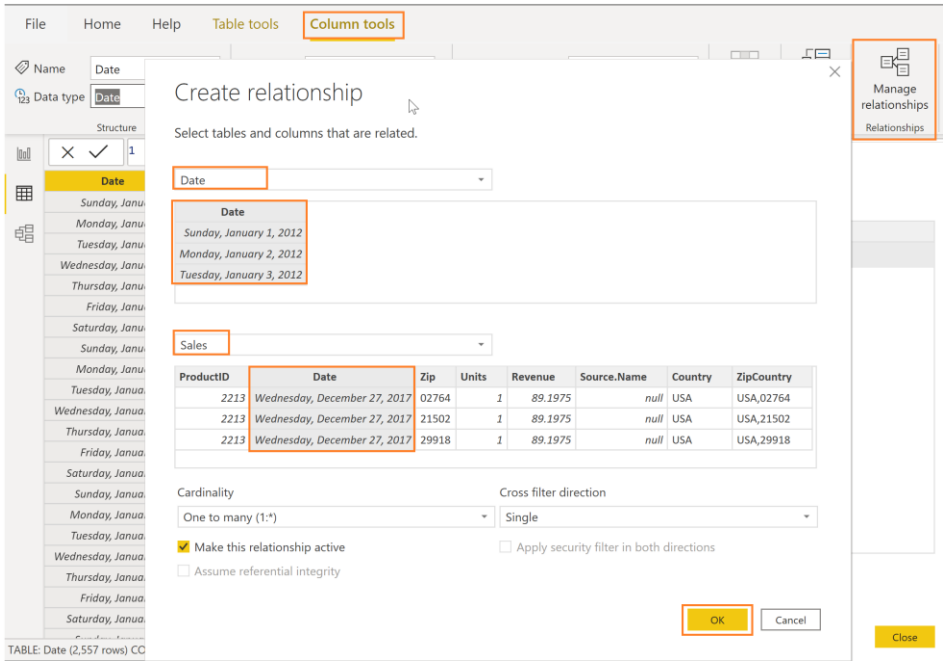
The card visual will give us the Revenue as we filter and cross filter the visuals.

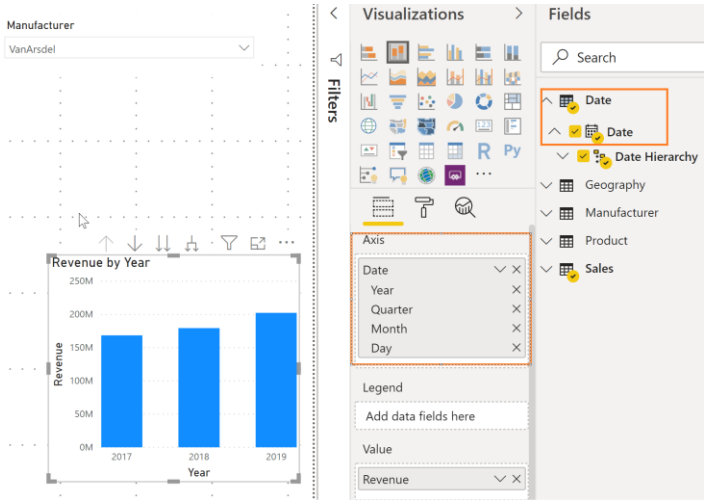
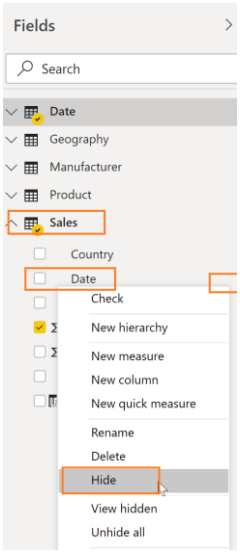
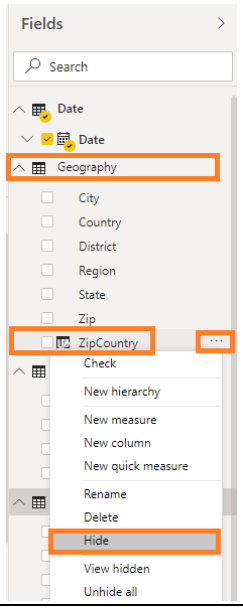


Notice all key dimensions/characteristics is in its own table with the related attributes **except date**. E.g. Product attributes are in Product table and we created a relationship between Product and Sales.
It is good practice to have dimensions in different tables. In the future if we need to add date attributes like Week number, Day of Week, Holiday, etc., we need to have a Date table. Let's create Date table.

10. Navigate to Data view by clicking on the **Data** icon on the left panel.
11. From the ribbon select **Modeling -> New Table**.
Notice a new table is created in the FIELDS section on the right and formula bar opens.
12. Enter **Date =CALENDAR (DATE(2012,1,1), DATE(2019,12,31))** in the formula bar and click on the **check mark**. A Date table with a Date column is created.
We are using 2 DAX functions: **CALENDAR** function which takes the start and end data. **DATE** function which takes year, month and date fields.



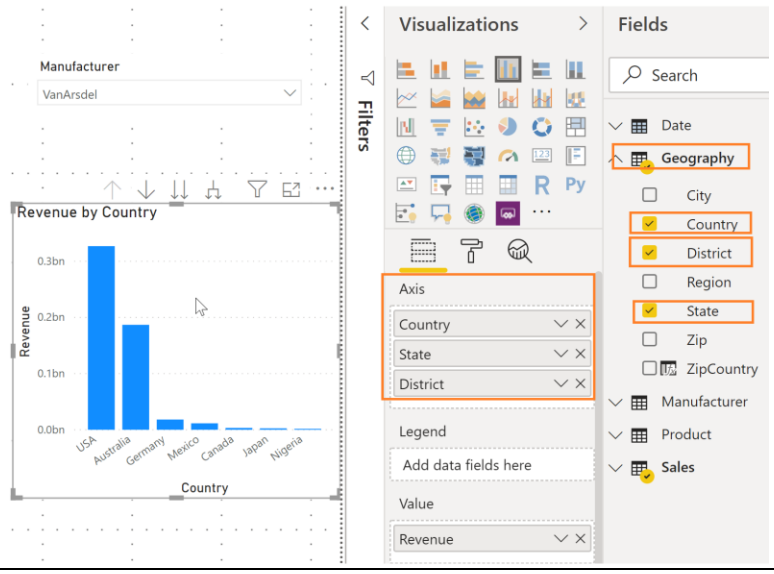
We are creating Date from 2012 to 2019 since our dataset has data for those years. We can add more fields to this table like Year, Month, Week etc. by using DAX functions.	
Notice Date field is of type Date/Time. Let's change it to data type Date. 13. Select the **Date** field in the **Date** table. 14. From the ribbon, select **Modeling -> Data type -> Date**.	
Next, we need to create a relationship between the newly created Date table and Sales table. Previously we used the visual drag and drop feature to create a relationship. This time around let's use a different option. 15. From the ribbon, select **Column Tools -> Manage Relationships**. 16. Manage Relationships dialog opens. Select **New** button. 17. Create relationship dialog opens. Select **Date** from the top dropdown. 18. Select **Sales** from the second dropdown. 19. Highlight **Date** fields from both the tables. 20. Select **OK** to close Create relationship dialog. 21. Select **Close** to close Manage relationships dialog.	

22. Navigate to Report view by clicking on the **Report** icon on the left panel. Notice Revenue by Date chart looks different. Let's fix it. 23. Select **Revenue by Date** visual. 24. From the **Axis** click on "**X**" to remove the **Date** field. 25. From the **FIELDS** section expand **Date** table. 26. Drag **Date** field to **Axis** section. Notice with the new Date field behavior is like earlier.	
There are two Date fields, it might get confusing to figure out which to use. Let's hide the Date field in Sales table. 27. From the **FIELDS** section, Click on the **ellipsis** next to **Date** field in **Sales** table. 28. Select **Hide**. This hides Date field in the reports view. We have the option to view hidden fields and unhide fields as needed. 29. Similarly hide **Country, ProductID, Zip and ZipCountry** in **Sales** as well	
30. Similarly hide **ZipCountry** from the **Geography** table. 31. Hide **ManufacturerID** from **Manufacturer** table. 32. Hide **ProductID** and **ManufacturerID** from **Product** table. 33. **Note**: It is best practice to hide fields that are not used in reports.	

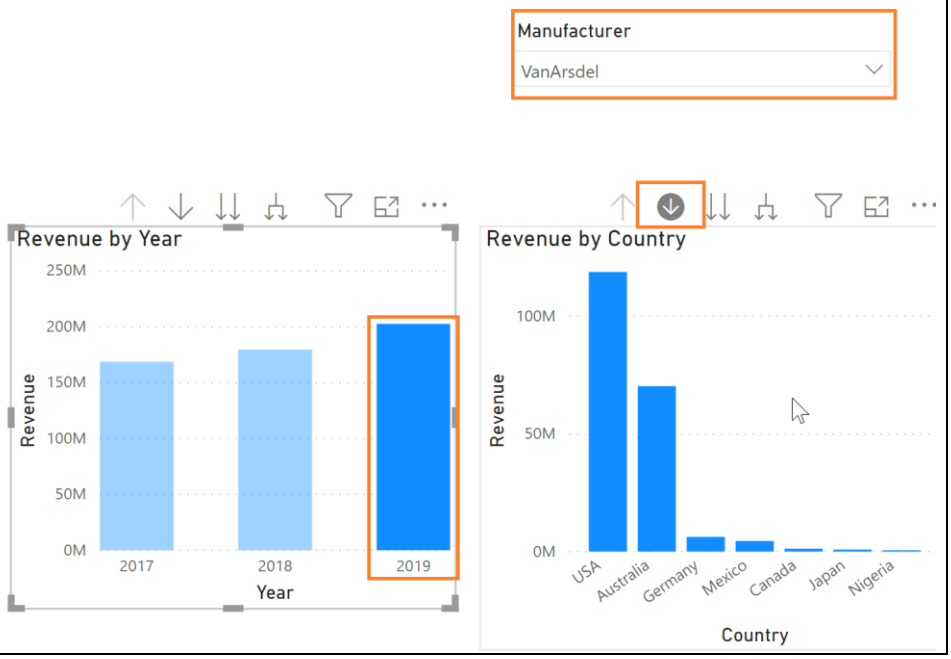
Let's get back to our data story, Australia, VanArsdel and 2018 – remember 😊.
Let's check if the spike occurred in a specific region in Australia.

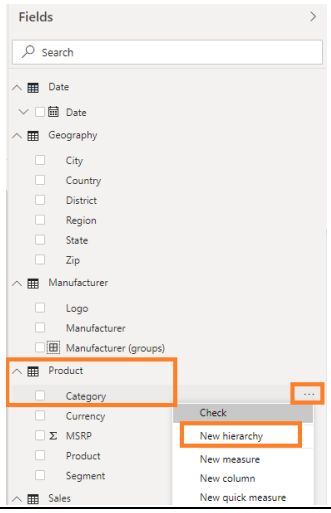
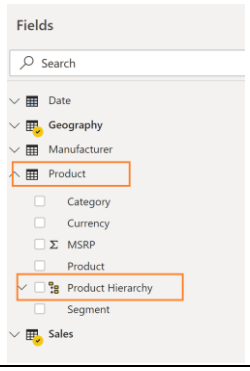
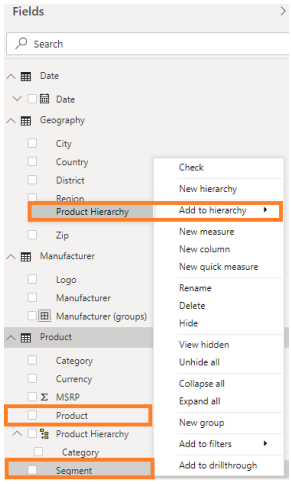
34. Select **Revenue by Country** visual.
35. From the **FIELDS** section, drag **State** field from **Geography** table, below **Country** in the **Axis** section.
36. Drag **District** field below **State** in the **Axis** section.

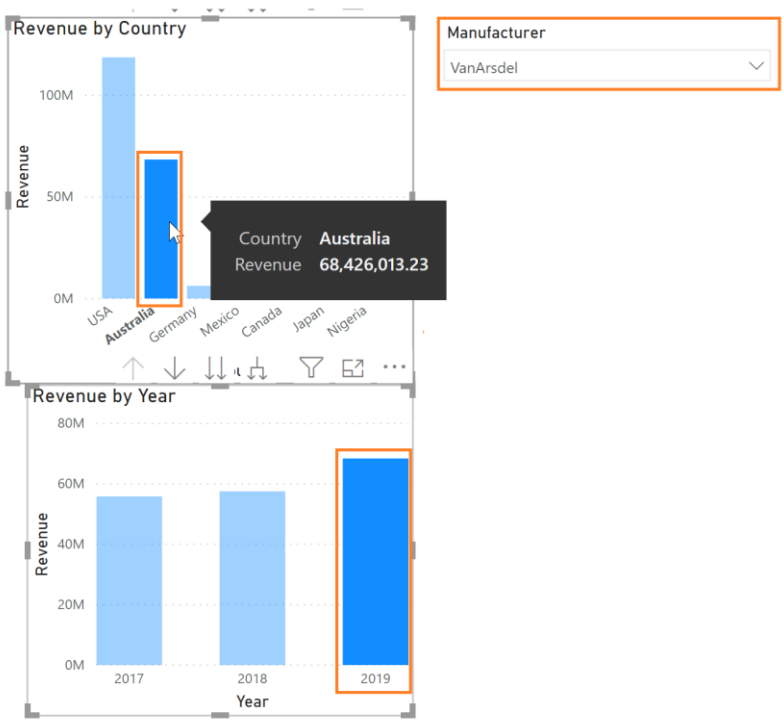
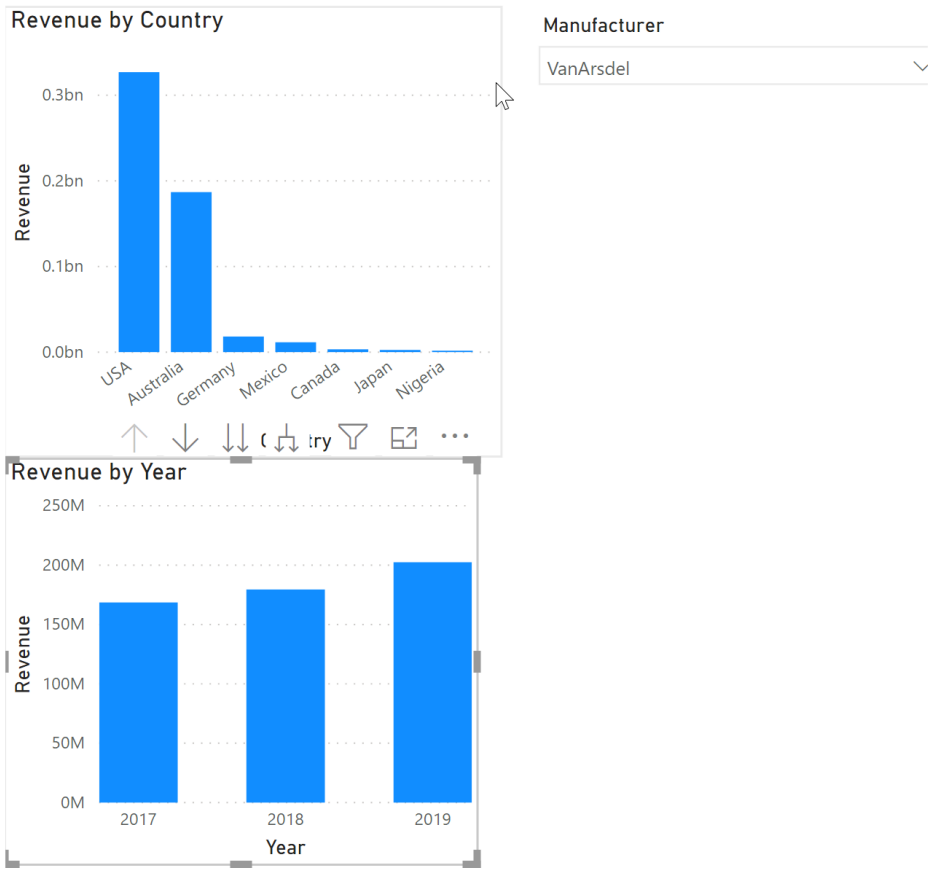
We just created a hierarchy.



37. Make sure **VanArsdel** is selected in the Manufacturer **slicer**.
38. **Enable Drill mode** by selecting down arrow on the top right corner of Revenue by Country visual.
39. Select **Australia** to drill down to **State level**.
40. From **Revenue by Year** visual select **2019** and notice Revenue by Country and State visual.
41. **Drill up** to **country** level.



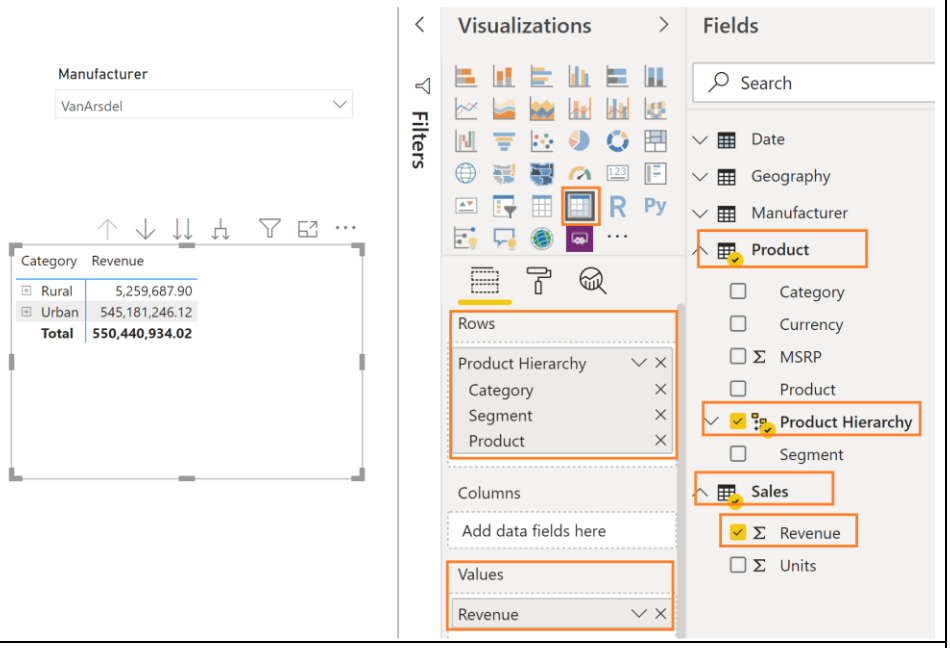
Let's analyze by Product to figure out what's happening there. Before we start with that let's create a Product Hierarchy. This way we don't have to drag multiple fields to the visual. 42. From the **FIELDS** section, click on the **ellipsis** next to **Category** in **Product** table. 43. Select **New Hierarchy**.	
Notice a new field called Category Hierarchy is created in the Product table. 44. **Double click** on **Category Hierarchy** and **rename** it to **Product Hierarchy**.	
45. Click on the **ellipsis** next to **Segment**. 46. Select **Add to Hierarchy -> Product Hierarchy**. 47. Click on the **ellipsis** next to **Product**. 48. Select **Add to Hierarchy -> Product Hierarchy**. We have created a Product Hierarchy which is Category -> Segment -> Product.	

49. In **Revenue by Country** visual select **Australia.** 50. **Ctrl+Click 2019** from Revenue by Year visual. Notice sales in Extreme category is higher than Convenience and Moderation segments. We need to investigate further…	
51. Select the **down arrow** on the top right corner of **Revenue by Country** visual to enable drill model. 52. Select **Australia** to **drill down** to **State** level. 53. Select **2018** in Revenue by Year visual. 54. **Remove drill mode** from Revenue by Category visual. 55. **Ctrl+Click Extreme** Segment in Revenue by Category and Segment visual. 56. Select **2017** in Revenue by Year visual. 57. **Ctrl+Click Extreme** Segment in Revenue by Category and Segment visual. There is no significant spike by State. 58. Select **Extreme** again to remove cross filtering between visuals. 59. **Drill up to Category level** in Revenue by Category visual.	

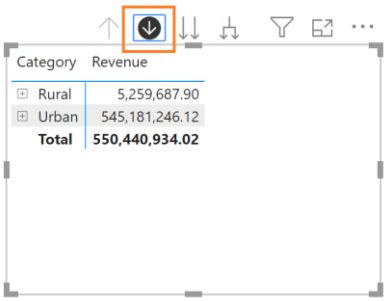
Let's add a Matrix visual so we can view data in rows and columns. We can apply conditional formatting to the matrix visual to highlight outliers.

60. Click on the white space in the canvas. From the **VISUALIZATIONS** section, select **Matrix** visual.
61. From **FIELDS** section, drag and drop **Product Hierarchy** field from **Product** table to **Rows** section.
62. From **Sales** table in **FIELDS** drag and drop **Revenue** to **Values** section.

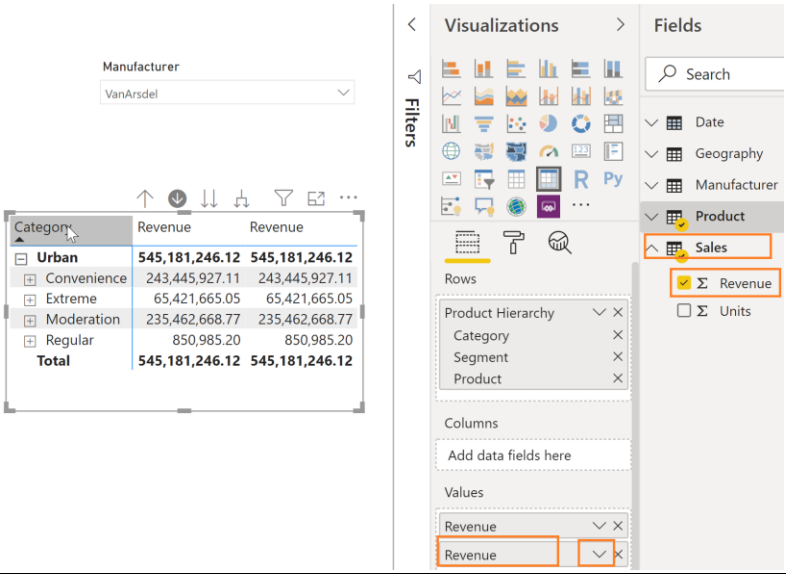
Note: Notice Revenue field needs to be formatted so it shows the same number of decimal points. We will do this shortly.



63. **Enable drill mode** in the **matrix** by selecting the down arrow on the top right corner of the visual.
64. Select **Urban** row to drill down.

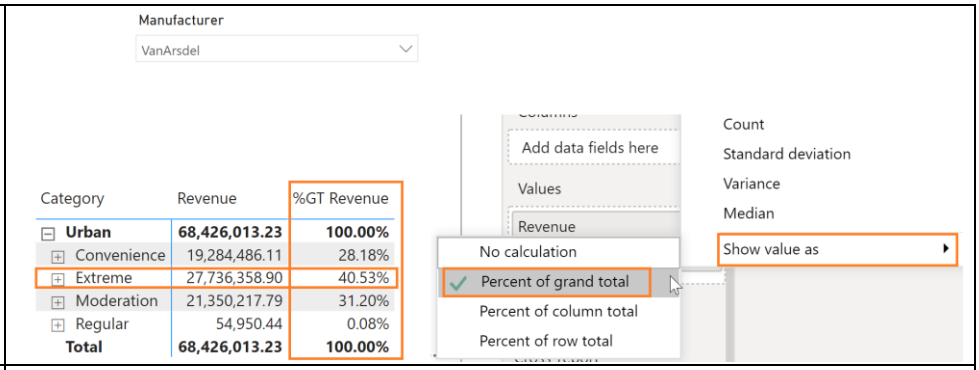


Let's add percent of total field. This will give us a better perspective.
65. Navigate away from Format section to the **Fields** well.
66. From **FIELDS** section drag **Revenue** field from **Sales** table below the existing Revenue field in **Values** section.
67. Select the **arrow** next to the newly added **Revenue** field.



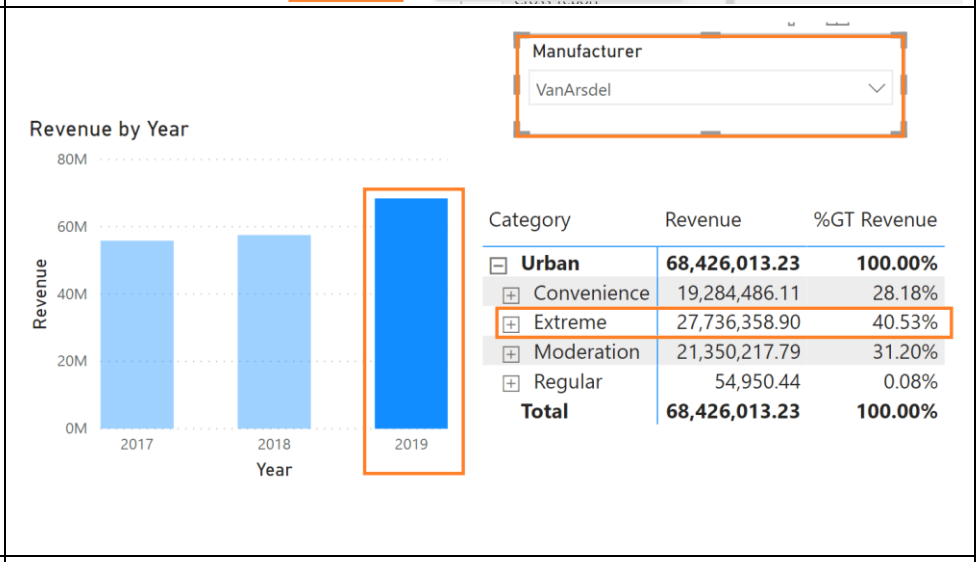
68. From the dialog select **Show value as -> Percent of grand total**.
69. Make sure you have **Australia** and **2019** selected on the other charts

We see that in Australia, Extreme segment has highest market share. Let's check across time if this is true.



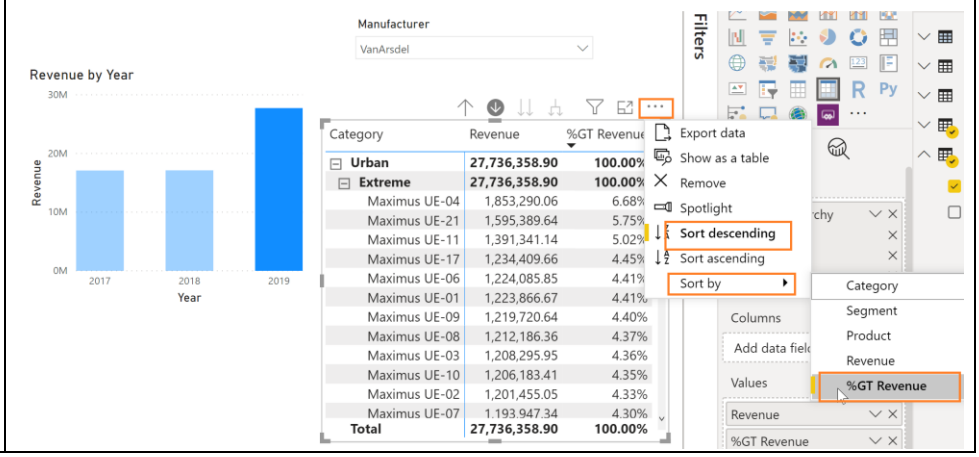
70. In the **Revenue by Year** visual select **2017** column. Notice Extreme segment has around **30%** of the grand total.
71. In the **Revenue by Year** visual select **2018** column. Notice Extreme segment has around **30%** of the grand total.
72. In the **Revenue by Year** visual select **2019** column. Notice Extreme segment has around **40%** of the grand total.
73. In the **Revenue by Year** visual select **2019** column to remove the filter.

Let's drill down Extreme Segment and figure out if a Product stands out.

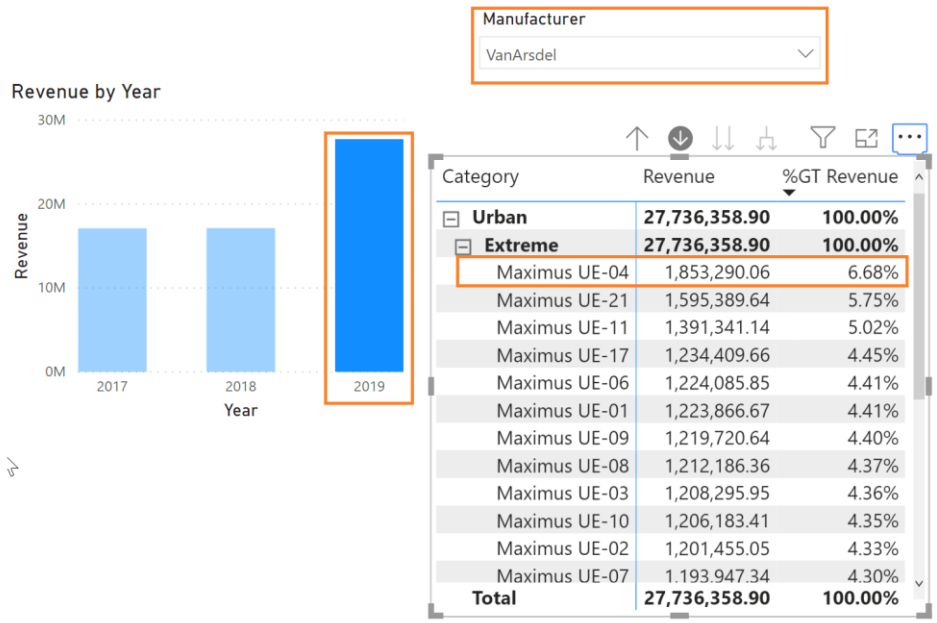


74. In the **matrix** visual select **Extreme** row to **drill down** to Product level.
75. **Resize** the visual as needed.
76. **Hover** over matrix visual and select the **ellipsis** on the top right corner.
77. Select **Sort By %GT Revenue** and **Sort Descending**.

We see the top Products.



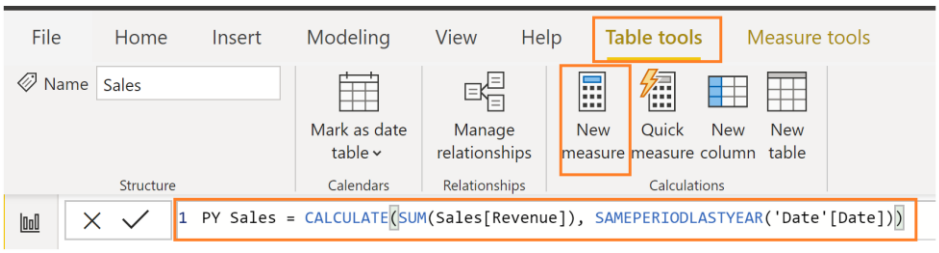
78. In the **Revenue by Year** visual select **2019** column. Notice Maximus UE-04 and 21 are the top products. And Product 04 has nearly 7% of the grand total. Product 04 has a big spike.
79. In the **Revenue by Year** visual select **2019** column to remove the filter.



Category	Revenue	%GT Revenue
Urban	**27,736,358.90**	**100.00%**
Extreme	**27,736,358.90**	**100.00%**
Maximus UE-04	1,853,290.06	6.68%
Maximus UE-21	1,595,389.64	5.75%
Maximus UE-11	1,391,341.14	5.02%
Maximus UE-17	1,234,409.66	4.45%
Maximus UE-06	1,224,085.85	4.41%
Maximus UE-01	1,223,866.67	4.41%
Maximus UE-09	1,219,720.64	4.40%
Maximus UE-08	1,212,186.36	4.37%
Maximus UE-03	1,208,295.95	4.36%
Maximus UE-10	1,206,183.41	4.35%
Maximus UE-02	1,201,455.05	4.33%
Maximus UE-07	1,193,947.34	4.30%
Total	**27,736,358.90**	**100.00%**

Earlier we created a calculated column (ZipCountry). Let's create % Growth measure so we can compare sales over time. We are going to do this in two steps.

But first, what's the difference between measure and calculated column.
Calculated column is evaluated row by row. We extend a table by adding calculated columns.
Measure is used when we want to aggregate values from many rows in a table.
80. In the **FIELDS** section, select **Sales** table.
81. From the ribbon, select **Modeling -> New Measure**. Formula bar opens.
82. Enter **PY Sales = CALCULATE(SUM(Sales[Revenue]), SAMEPERIODLASTYEAR('Date'[Date]))**
83. Select the **check mark** next to the formula bar. You will see PY Sales measure in Sales table.



Let's create another measure.

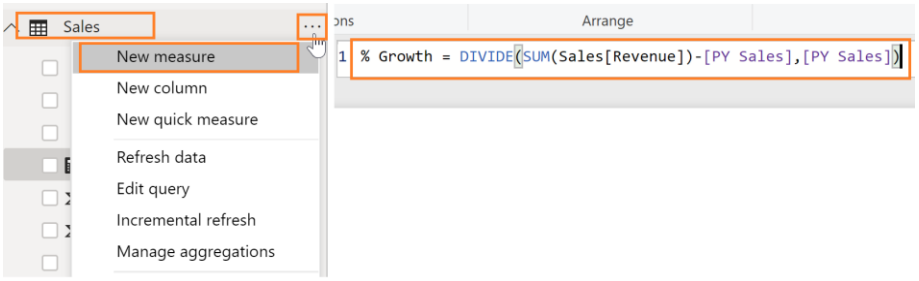
84. In the **FIELDS** section, hover over **Sales** table.

85. Click on the **ellipsis** on the right corner.

86. Select **New Measure** from the dialog. Formula bar opens.

87. Enter **% Growth = DIVIDE(SUM(Sales[Revenue])-[PY Sales],[PY Sales])**

88. Select the **check mark** next to the formula bar. You will see % Growth measure in Sales table.



89. Select the **matrix** visual.

90. In the **FIELDS** section, click the checkbox next to the newly created **PY Sales and % Growth** measures in **Sales** table.

Notice fields need to be formatted.

91. From the **FIELDS** section, select **% Growth** field.

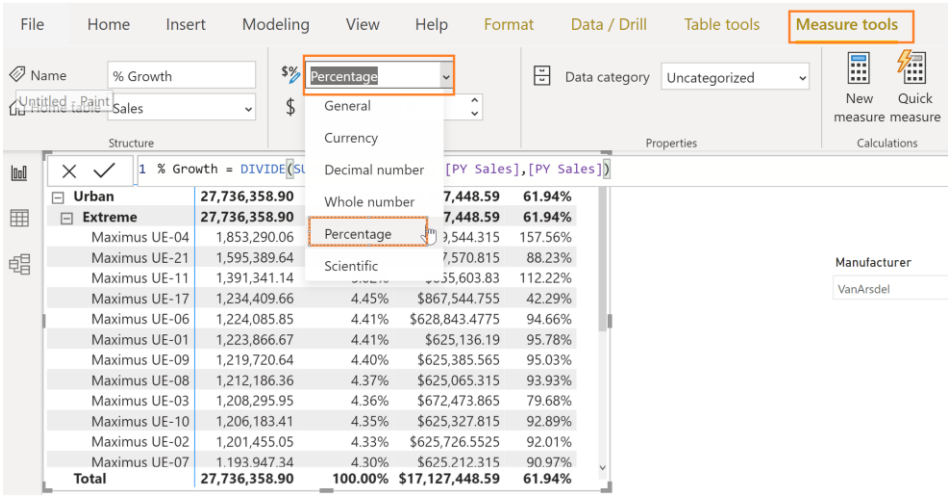
92. From the ribbon select **Measure Tools -> Format -> Percentage**

93. Similarly, from the **FIELDS** section, select **PY Sales** field.

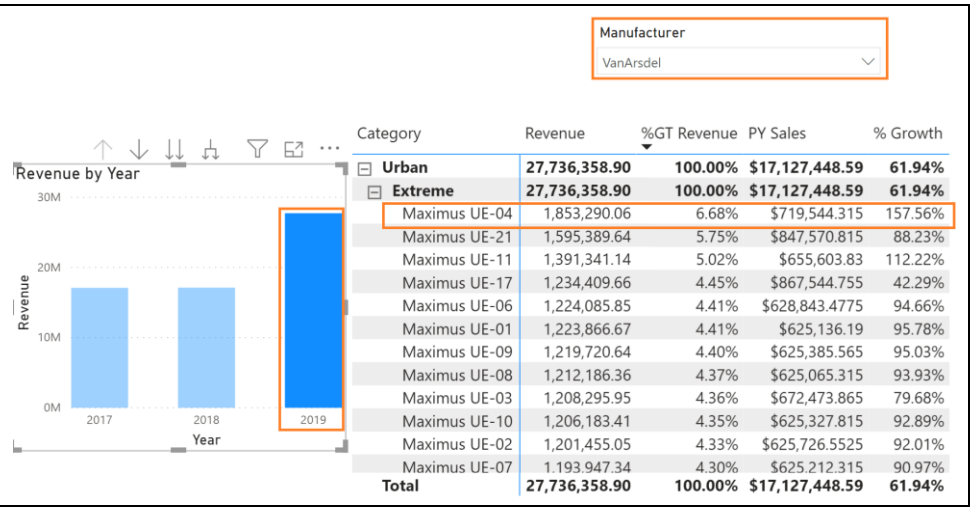
94. From the ribbon select **Modeling -> Format -> Currency -> $ English (United States)**

95. Similarly, from the **FIELDS** section, select **Revenue** field.

96. From the ribbon select **Modeling -> Format -> Currency -> $ English (United States)**



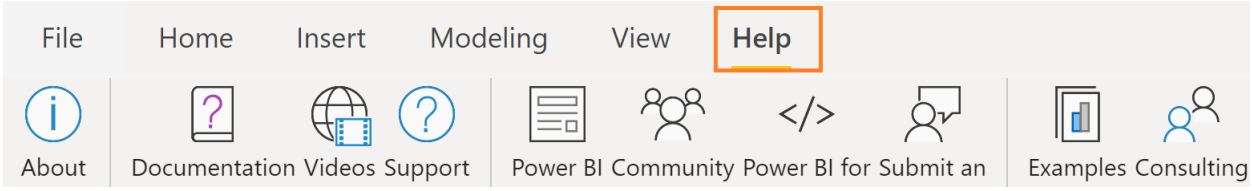
Urban	27,736,358.90			61.94%
Extreme	27,736,358.90			61.94%
Maximus UE-04	1,853,290.06			157.56%
Maximus UE-21	1,595,389.64			88.23%
Maximus UE-11	1,391,341.14			112.22%
Maximus UE-17	1,234,409.66	4.45%	$867,544.755	42.29%
Maximus UE-06	1,224,085.85	4.41%	$628,843.4775	94.66%
Maximus UE-01	1,223,866.67	4.41%	$625,136.19	95.78%
Maximus UE-09	1,219,720.64	4.40%	$625,385.565	95.03%
Maximus UE-08	1,212,186.36	4.37%	$625,065.315	93.93%
Maximus UE-03	1,208,295.95	4.36%	$672,473.865	79.68%
Maximus UE-10	1,206,183.41	4.35%	$625,327.815	92.89%
Maximus UE-02	1,201,455.05	4.33%	$625,726.5525	92.01%
Maximus UE-07	1,193,947.34	4.30%	$625,212.315	90.97%
Total	27,736,358.90	100.00%	$17,127,448.59	61.94%

97. In the **Revenue by Year** visual select **2019** column. Notice Maximus UE-04 has nearly 158% growth compared to last year.	

Category	Revenue	%GT Revenue	PY Sales	% Growth
Urban	**27,736,358.90**	**100.00%**	**$17,127,448.59**	**61.94%**
Extreme	**27,736,358.90**	**100.00%**	**$17,127,448.59**	**61.94%**
Maximus UE-04	1,853,290.06	6.68%	$719,544.315	157.56%
Maximus UE-21	1,595,389.64	5.75%	$847,570.815	88.23%
Maximus UE-11	1,391,341.14	5.02%	$655,603.83	112.22%
Maximus UE-17	1,234,409.66	4.45%	$867,544.755	42.29%
Maximus UE-06	1,224,085.85	4.41%	$628,843.4775	94.66%
Maximus UE-01	1,223,866.67	4.41%	$625,136.19	95.78%
Maximus UE-09	1,219,720.64	4.40%	$625,385.565	95.03%
Maximus UE-08	1,212,186.36	4.37%	$625,065.315	93.93%
Maximus UE-03	1,208,295.95	4.36%	$672,473.865	79.68%
Maximus UE-10	1,206,183.41	4.35%	$625,327.815	92.89%
Maximus UE-02	1,201,455.05	4.33%	$625,726.5525	92.01%
Maximus UE-07	1,193,947.34	4.30%	$625,212.315	90.97%
Total	**27,736,358.90**	**100.00%**	**$17,127,448.59**	**61.94%**

References

Dashboard in a Day introduces you to some of the key functionalities available in Power BI. In the ribbon of Power BI Desktop, the Help section has links to some great resources to help you as needed.



Here are a few more references that will help you with your next steps with Power BI.

Getting started: http://powerbi.com

Power BI Desktop: https://powerbi.microsoft.com/desktop

Power BI Mobile: https://powerbi.microsoft.com/mobile

Community site https://community.powerbi.com/

Power BI Getting started support page: https://support.powerbi.com/knowledgebase/articles/430814-get-started-with-power-bi

Support site https://support.powerbi.com/

Feature requests https://ideas.powerbi.com/forums/265200-power-bi-ideas

Power BI advanced Training: http://aka.ms/pbitraining

Power BI edX course:
https://www.edx.org/course/analyzing-visualizing-data-power-bi-microsoft-dat207x-0

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