

Technology Support

Excel PowerPivot ShortCourse Handout



Information Technology Division

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Excel PowerPivot

ShortCourse Handout



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Introduction

Microsoft **PowerPivot in Excel 2013** is an **Add-in** tool that can be used to perform powerful data analysis in **Excel 2013**. The add-in is available in **Microsoft Office Professional Plus**. PowerPivot enables you to import data from virtually any data source, such as Microsoft Access databases, Text files, Excel files, and live data imported from a Web sites. PowerPivot for Excel allows you to create a variety of visual data, such as PivotTable, and PivotCharts. In both Excel and in PowerPivot, you can create a **Data Model**, a collection of **tables** with **relationships**.

Data Models are created implicitly when you import two or more tables simultaneously in Excel. However, Data Models are created explicitly when you use the PowerPivot Add-in to import data. In the Add-in, the model is represented in a tabbed layout, where each tab contains tabulated data.

Any data you import into Excel is available in PowerPivot, and vice versa. By using PowerPivot you can analyze data in ways that go way beyond "regular Excel". You can get more done in less time.

Credit: This document was adapted from Microsoft Excel 2013 Help and Documentation.

Course Objectives

After completing this ShortCourse, you should be able to:

- Import data from multiple sources;
- Create linked data;
- Create relationships between data from different sources;
- Perform calculations in PowerPivot;
- Rename columns;
- Create PivotTables and PivotCharts; and
- Add Slicers.

Activating the PowerPivot Add-in

The simplest way to activate the **PowerPivot add-in** is to just insert a **PowerView** sheet from the Ribbon. This will automatically create an empty Data Model, insert a blank **PowerView** canvas and activate the PowerPivot Ribbon.

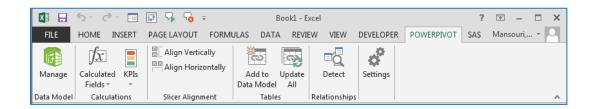


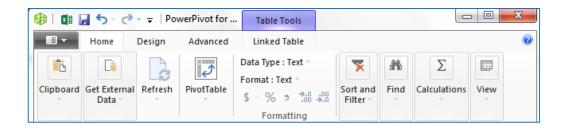
To Enable PowerPivot

- From the **FILE** menu, click **Options** -> select **Add-Ins**.
- In the Manage: box, click COM Add-ins -> Go...
- Check the Microsoft Office PowerPivot for Excel 2013 box, and then click
 OK. After you install PowerPivot, you see a POWERPIVOT tab on the Ribbon.
- Clicking the **POWERPIVOT tab** displays the options available.
- Clicking the Manage in Data Model group, opens the PowerPivot Window.

Excel Options			8 X
General	View and r	nanage Microsoft Offi	ce Add-ins.
Formulas		nanage microsoft om	
Proofing	Add-ins		
Save	Name 🔺		Location A
Language	Active Application		=
Advanced	Acrobat PDFMak	er Office COM Addin	C:\din.c ▼
Customize Ribbon	Add-in:	Acrobat PDFMaker Offi	ce COM Addin
Quick Access Toolbar	Publisher:	Adobe Systems, Incorpo	
Add-Ins	Compatibility: Location:	No compatibility inform C:\Program Files\Adob PDFMaker\Office\PDFN	e\Acrobat 10.0\
Trust Center	Description:	Acrobat PDFMaker Offi	ce COM Addin
	M <u>a</u> nage: Excel A	Add-ins	<u>G</u> o
	•		
		ОК	Cancel

After successfully enabling PowerPivot, the **POWERPIVOT** tab should appear in Excel ribbon.





Example: Adapted from <u>http://www.mssqltips.com/sqlservertip/2868/powerpivot-</u> <u>with-excel-2013</u> accessed on 9/26/2013.

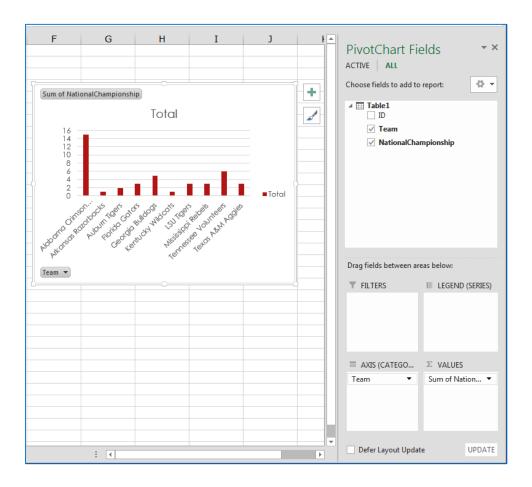
Suppose that you have run a query and copied/pasted your results into the Excel spreadsheet. And suppose that the query results look like this:

ID	Team	NationalChampionship
1	Alabama Crimson Tide	15
2	Tennessee Volunteers	6
3	Georgia Bulldogs	5
4	Florida Gators	3
5	LSU Tigers	3
6	Texas A&M Aggies	3
7	Mississippi Rebels	3
8	Auburn Tigers	2
9	Arkansas Razorbacks	1
10	Kentucky Wildcats	1

- Select your data -> click the PowerPivot tab -> click Add to Data Model.
 On the create table dialog box, make sure you select the range for your data and click "My table has headers" check box.
- After clicking OK, the PowerPivot window should appear.
- Click **PivotTable** -> **PivotChart**, and then select **New Worksheet**.
- In a graph, to see each **Team** and how many **National Championships** they have won click on the **PivotChart**, and the **PivotChart Fields**. The list should appear on the right side. If the Field list doesn't appear, right click in the Chart and select **Show Field List**.
- Drag Team to the AXIS box and drag NationalChampionships to the VALUES box. This indicates that you will be reporting on each team with the number of National Championships being the value you want to show.

	Α	В	С			
1	ID	Team	NationalChampionship			
2	1	Alabama Crimson Tide	15			
3	2	Tennessee Volunteers	6			
4	3	Georgia Bulldogs	5			
5	4	Florida Gators	3			
6	5	LSU Tigers	3 3 3			
7	6	Texas A&M Aggies	3			
8	- 7	Mississippi Rebels	3			
9	8	Auburn Tigers	2			
10	9	Arkansas Razorbacks	1			
11	10	Kentucky Wildcats	1			
12		Create Table	2 ×			
13						
14		Where is the data for you	is table?			
15		\$A\$1:\$C\$11				
16		· · · · · · · · · · · · · · · · · · ·				
17		My table has headers				
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	Pivot <u>T</u> able	
[ID] •	Pivot <u>C</u> hart	*
🔟 I 🔽 Team 🔽 Na		Column
1 Alaba	Chart and Table (Vertical)	
2 Tennes	Two Charts (Horizontal)	
3 Georgi	Two Charts (Vertical)	
4 Florida	Eour Charts	
5 LSU Ti	Flattened PivotTable	
6 Texas	3	
7 Mississi	3	
8 Auburn	2	
9 Arkans	1	
10 Kentuc	1	
		î
se Table 1		
Record: I I I of 10	► H	🛄 🖷:

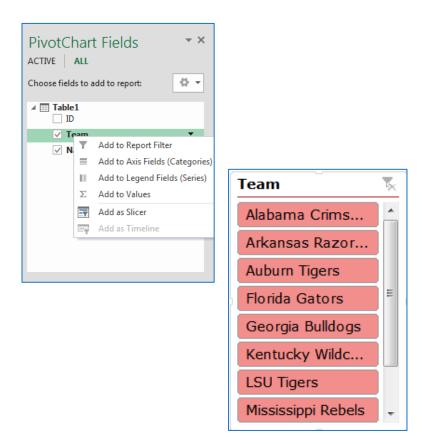


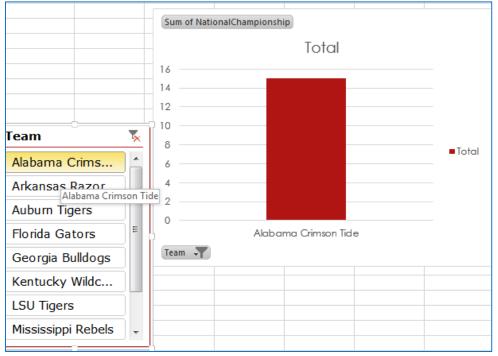


To Add a Slicer to your Graph

To choose between which teams to display:

- While PivotChart is selected, using the PIVOTCHART TOOLS -> on ANALYZE tab -> Insert Slicer (or right-click on Team filed -> Add As Slicer)
- Now, if you click on a team in the slicer, for example, **Alabama Crimson Tide**, you will notice it shows results for only Alabama Crimson Tide.
- You can also **CTRL + Click** to select multiple teams or click the button to set the slicer back to default.



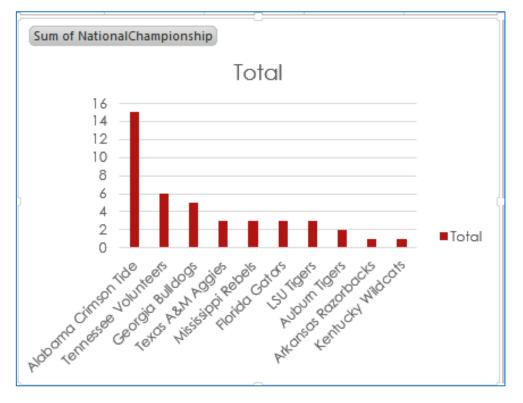


To change Order of Chart Results

By default the graph puts the teams in alphabetical order. To change the graph to display the National Championships in order:

- Click the down arrow beside **Team** (on the PivotChart Fields Pane on the right, or on the graph) and click **More Sort Options**...
- Change the Sort to Descending (Z to A) by: and select Sum of NationalChampionships.

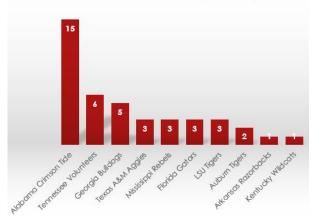
Sort (T	Team)	x
Sort o	options	
0	Manual (you can drag items to rearrange th	nem)
0	Ascending (A to Z) by:	
	Team	Ŧ
۲	Descending (Z to A) by:	
	Sum of NationalChampionship	-
Sumn	Team Sum of NationalChampionship	^
Sor	4	
Moj		Ŧ



To Change chart title and remove Legend and unwanted field buttons

- Click on the title and rename it SEC National Championship.
- Click the chart legend, and **Delete**.
- To hide the field buttons, right-click the button and select "Hide Buttons"
- To change the color of the bars in the graph or style of the graph, click on the chart and select the **Design** tab under **PivotChart Tools**.

SEC National Championship



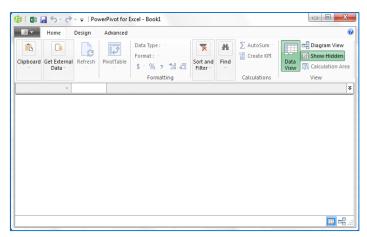
To Open the PowerPivot window

Click the **PowerPivot** tab. This is the tab where you work with
 PowerPivot, **PivotTables**,

Calculated Fields, and creating linked tables.

 Click Manage (in Data Model group).
 Now you're in the PowerPivot window. Here you can click Get
 External Data to use the Table

Import Wizard to filter data as you



add it to your file, **create relationships** between tables, perform calculations and expressions, and then use this data to create **PivotTables** and

PivotCharts.



PivotTable data analysis using a Data Model in Excel 2013

To build a **PivotTable report** in Excel that combines data from multiple tables, we will import several tables and then use the **PowerPivot add-in** to refine the data model that lives behind the report learning how to add calculations to our report. We will use **PowerPivot Sample Data** available for download @ http://powerpivotsdr.codeplex.com

To Import Data

- In Excel, open a blank workbook.
- Click Data tab-> Get External Data (drop-down list)-> From Database -> From Access
- Go to the folder that contains the Sample Data files and select
 ContosoSales (in the ShortCourses folder)
- Click **Open**. Because you are connecting to a database file that contains multiple tables, the **Select Tables** dialog appears so that you can choose which tables to import.
- Check Enable selection of multiple tables' box, to select all tables -> check the Name box -> click OK twice, to create a PivotTable Report (this may take some time). You just created a data model (implicit). The model is a data integration layer that is created automatically when you import or work with multiple tables simultaneously in the same PivotTable report. Now you can view and modify this model using the PowerPivot.

V Name	Description	Modified	Created	Туре
🚺 🧱 DimChannel		5/11/2010 7:42:28 PM	5/10/2010 1:38:39 PM	TABLE
🚺 🧱 DimDate		5/11/2010 7:42:38 PM	5/10/2010 1:38:39 PM	TABLE
🚺 🔠 DimProduct		5/14/2010 4:35:44 PM	5/14/2010 1:04:38 PM	TABLE
🚺 🔠 DimProductSubcategory		5/11/2010 7:43:12 PM	5/10/2010 1:38:41 PM	TABLE
🚺 🔠 DimPromotion		5/14/2010 12:48:30 PM	5/14/2010 12:47:43 PM	TABLE
FactSales		5/14/2010 4:36:32 PM	5/14/2010 1:04:39 PM	TABLE
(

	Import Data		8 X	
	☐ _ Table ↓ O Table ↓ O PivotTab ↓ O PivotCha ↓ O Power V	art iew Report :ate Connection to put the data? :sheet: :et	n your workbook.	
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A B C 1 2 3 4	D E F	G H	A	PivotTable Fields * * CTIVE ALL hoose fields to add to report:
5 PivotTable1 6 To build a report, cl fields from the Pivo				E DimChannel
8 Field List 9 10 11			Þ	DimProduct DimProductSubcategory DimPromotion
12 13 14 15			C	Trag fields between areas below: COLUMNS
16 17 18 19				■ ROWS ∑ VALUES
20 21 22 23				
↓ Sheet2 Sheet1 READY ⊞	÷ :			Defer Layout Update UPDATE UPDATE + 100%

Exploring Data Using a PivotTable

Now you can explore data by dragging **PivotTable Fields** to the **Values**, **Columns**, and **Rows** areas on the **PivotTable Fields** list.

• In the **PivotTable Fields** list scroll down until you find the **FactSales** table.

- Expand the table, and then click **SalesAmount** field. Because this data is numeric, Excel automatically places **SalesAmount** in the **Values** area.
- From the **DimDate** table, drag **CalendarYear** field to **Columns**.
- From **DimProductSubcategory** table, drag the **ProductSubcategoryName** field to **Rows**.
- From DimProduct table, drag the BrandName field to Rows, placing it beneath ProductSubcategoryName. You now have a basic PivotTable that includes fields from four different tables. *Note:* Because the tables that you imported had pre-existing relationships among the tables, Excel recreated those relationships in the model.

	А	В	С	D	[4			
1	Sum of SalesAmount	Column Labels 💌					PivotTable Fields		▼ X
2	Row Labels 🔹	2007	2008	2009	Gra		ACTIVE ALL		
3	Bluetooth Headphones	3773927.486	14773699.57	23359861.86	41				- 0 v
4	Northwind Traders	2282551.51	7152268.195	10728184.27	20		Choose fields to add to report:		- 12 •
5	Wide World Importers	1491375.976	7621431.376	12631677.59	21		ProductDescription		
6	Camcorders	565899768.1	457309394.5	312093607.4	1		ProductSubcategoryKey		
7	Fabrikam	565899768.1	457309394.5	312093607.4	1				
8	Cameras & Camcorders Accessories	11511262.09	12958723.44	27173790.3	51		Manufacturer		
9	Contoso	11511262.09	12958723.44	27173790.3	51		✓ BrandName		
10	■ Car Video	120587054.5	98369449.72	87862340.35	30		ClassID		•
11	Southridge Video	120587054.5	98369449.72	87862340.35	30				
12	Cell phones Accessories	19432285.6	26966826.36	73618086.3	12		Drag fields between areas below:		
13	Contoso	19432285.6	26966826.36	73618086.3	12		T FILTERS		
14	Computers Accessories	25102979.68	36278885.58	49641936.85	11		1 HEIERS	CalendarYear	_
15	Contoso	15046319.13	23402074.79	27622201.41	66			CalendarYear	•
16	Southridge Video	10056660.55	12876810.79	22019735.43	44				
17	Desktops	235958217.1	174779019.8	97459700.11	50				
18	Adventure Works	164015355.3	98627168.6	49078903.87	31		ROWS	Σ VALUES	
19	Wide World Importers	71942861.85	76151851.25	48380796.24	19				
20	Digital Cameras	164036668.5	108331099.5	92714721.91	36		ProductSubcategoryName	Sum of SalesAmount	• •
21	A. Datum	164036668.5	108331099.5	92714721.91	36		BrandName 🔻		
22	Digital SLR Cameras	361246218.8	239304614.7	209443904.8	80				
23	A. Datum	109818682.6	75674956.35	69227624.7	25				
- 14	 → Sheet1 (+) 	107070101	70100150.0	C0147005.17		*	Defer Layout Update		UPDATE

Adding ProductCategories Table to the Model

- In the workbook open a new Worksheet, to store additional data.
- Click Data -> Get External Data -> From Access.
- Go to the folder that contains the **Sample Data** files and select **ProductCategories**.
- Click **Open**.
- In **Import Data** dialog box, select **Table** radio button, and click **OK**.

Import Data	8 <mark>×</mark>
Select how you want to view this data in g	your workbook.
III 🔍 <u>T</u> able	
🚺 🔘 <u>P</u> ivotTable Report	
∎ 👼 🔘 Pivot <u>C</u> hart	
📰 💿 Power <u>V</u> iew Report	
Only Create Connection	
Where do you want to put the data?	
Existing worksheet:	
= SAS1	S
New worksheet	
Add this data to the Data Model	
Properties	Cancel

- 4	А	В	С	D	E	F	G
1	ProductCategoryKey 💌	ProductCategoryLabel 💌	ProductCategoryName 🛛 💌	ProductCategoryDescription 💌	ETLLoadID •	LoadDate 💌	UpdateDate 💌
2	1	01	Audio	Audio	1	7/7/2009	7/7/2009
3	2	02	TV and Video	TV and Video	1	7/7/2009	7/7/2009
4	3	03	Computers	Computers	1	7/7/2009	7/7/2009
5	4	04	Cameras and camcorders	Cameras and camcorders	1	7/7/2009	7/7/2009
6	5	05	Cell phones	Cell phones	1	7/7/2009	7/7/2009
7	6	06	Music, Movies and Audio Books	Music, Movies and Audio Books	1	7/7/2009	7/7/2009
8	7	07	Games and Toys	Games and Toys	1	7/7/2009	7/7/2009
9	8	08	Home Appliances	Home Appliances	1	7/7/2009	7/7/2009

Adding Geography data to the Model

- Insert another worksheet.
- From the Sample Data files, open Geography.xlsx
- Place the cursor in **A1**, and then press **Ctrl-Shift-End** to select all of the data.
- **Copy** the data to the clipboard.
- **Paste** the data into the empty worksheet you just added (Don't Deselect it).
- Click Format as Table (HOME -> Styles), choosing any style. In Format As Table, verify that My table has headers is selected -> click OK. Formatting the data as a table lets you name it, which will come in handy when you define relationships in a later step.
- Name the table Geography. In Table Tools -> Design, type Geography in Table Name.
- **Close** Geography.xlsx to clear it from your workspace.

Adding Stores data to the Model

Repeat the previous steps for the **Stores.xlsx** file, pasting its contents into an empty sheet. Name the table **Stores**.

• Insert another worksheet.

- From the **Sample Data** files, open **Stores.xlsx**, place the cursor in **A1**, and then press **Ctrl-Shift-End** to select all of the data.
- **Copy** the data to the clipboard.
- **Paste** the data into the empty worksheet you just added (Don't Deselect it).
- Click **Format as Table** (HOME -> Styles), choosing any style.
- In Format As Table, verify that My table has headers is selected -> click OK.
- Name the table Store. In Table Tools -> Design, type Store in Table
 Name.
- **Close** Stores.xlsx to clear it from your workspace.

You should now have **four worksheets**:

- **Sheet1** contains the **PivotTable**;
- Sheet2 contains ProductCategories data table;
- Sheet3 contains Geography data table; and
- Sheet4 contains Stores data table.

Using Fields from the Newly Imported Tables, to create a PivotTable

- On **Sheet1**, at the top of **PivotTable Fields**, click **All** to view the complete list of available tables.
- Scroll to the bottom of the list. That's where you'll find the new tables you just added.
- Expand the **Stores** table.
- Drag **StoreName** to the **Filters** area. *Notice* that Excel prompts you to create a relationship. This notification occurs because you've used fields from a table that is unrelated to the model.
- Click **Create** to open the **Create Relationship** dialog.
- Under Table: choose FactSales (from the drop-down list). In the sample data you're using, FactSales contains detailed sales and cost information about Contoso's business, as well as keys to other tables, including store codes that are also present in the Stores.xlsx file you imported in the previous step.
- Under Column (Foreign): choose StoreKey (from drop-down list).
- Under Related Table: choose Stores (from drop-down list).

- Under Related Column (Primary): choose StoreKey (from drop-down list).
- Click OK. Note: Behind the scenes, Excel is building a Data Model that can be used throughout the workbook in any number of PivotTables,

PivotCharts, or **Power View reports**. Fundamental to this model are **table relationships** that determine navigation and calculation paths used in a PivotTable report.

Create Relationship	? <mark>×</mark>
Pick the tables and columns you want to use for this relationship	
<u>T</u> able:	Col <u>u</u> mn (Foreign):
FactSales 🔹	StoreKey 💌
<u>R</u> elated Table:	Related Co <u>l</u> umn (Primary):
Stores 🗸 🗸	StoreKey 💌
Creating relationships between tables is necessary to show relate	d data from different tables on the same report.
Manage Relationships	OK Cancel

Adding Relationships Manually to Relate ProductSubcategory to ProductCategory

- In Excel, click Data -> Relationships -> New.
- Under Table: choose DimProductSubcategory.
- Under Column (Foreign): choose Table_ProductCategoryKey.accd
- Under Related Table: choose Table_ProductCategories.accbd.
- Under Related Column (Primary): choose ProductCategoryKey.
- Click OK.
- Close the Manage Relationships dialog.

Status	Table 🔺	Related Lookup Table	<u>N</u> ew
Active	DimProduct (ProductSubcategoryKey)	DimProductSubcategory (ProductSubcategoryK	
Active	FactSales (channelKey)	DimChannel (ChannelKey)	<u>E</u> dit
Active	FactSales (DateKey)	DimDate (Datekey)	Activate
Active	FactSales (ProductKey)	DimProduct (ProductKey)	
Active	FactSales (PromotionKey)	DimPromotion (PromotionKey)	Deac <u>t</u> ivate
Active	FactSales (StoreKey)	Stores (StoreKey)	Delete
			Delete

Adding ProductCategories table to the PivotTable

- In **PivotTable Fields**, click **All** to show tables that exist in the Data Model.
- Scroll to the bottom of the list.
- In the **Rows** area, remove **BrandName**.
- Expand Table_ProductCategories.accbd table.
- Drag ProductCategoryName to the Rows area, placing it *above* ProductSubcategory.
- In **PivotTable Fields**, click **Active** to verify that the tables you just used are now actively used in the PivotTable.

PivotTable Fields ACTIVE ALL Choose fields to add to report:	
 FactSales Stores Table_ProductCategories.accdb ProductCategoryKey ProductCategoryLabel ProductCategoryDescription ETLLoadID LoadDate UpdateDate 	PivotTable Fields ACTIVE ALL Choose fields to add to report: ○ □ DimChannel ○ □ DimDate ○ □ DimEntity ○ □ DimProduct ○ □ DimProductSubcategory
Drag fields between areas below: ▼ FILTERS StoreName StoreName ■ ROWS ProductSubc ProductCate	 DimPromotion FactSales Stores Table_ProductCategories.accdb

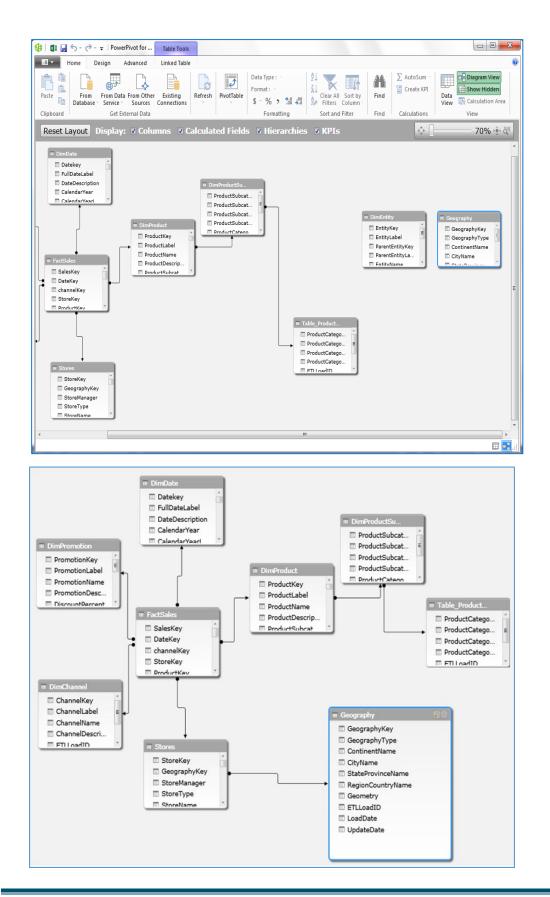
Adding a Relationship using Diagram View in PowerPivot

- In Excel, click Sheet3 to make it the active sheet. Sheet3 contains the Geography table you imported earlier. Click in a cell.
- On the ribbon, click PowerPivot -> Add to Data Model -> check the box for My table has headers -> click OK. This step adds the Geography table to the model. It also opens the PowerPivot add-in. Notice that the PowerPivot window shows all the tables in the model, including Geography (at the bottom of the window). Click through a couple of tables. In the add-in, you can view all of the data that your model contains.
- In the PowerPivot window, in the View group (on the HOME tab), click
 Diagram View. Use the slide bar to resize the diagram so that you can see all objects in the diagram (to the right).
- Zoom in on Geography so that you can view all of its fields (right-click -> maximize). You can use the slider to make the table diagram bigger. *Notice* Geography has GeographyKey. This column contains values that uniquely identify each row in the Geography table.
- While the Relationships window is open (Diagram View), to find out if other tables in the model also use this key, click **Find**.
- In Find Metadata, type GeographyKey.
- Click **Find Next** several times. You'll notice the **GeographyKey** shows up in the **Geography** table and in the **Stores** table. **Close** the **Find** dialog box.
- Reposition the Geography table so that it is next to Stores table.Drag the GeographyKey column in Stores to the GeographyKey column in Geography. PowerPivot draws a line between the two columns, indicating the relationship.

PowerPivot for Excel 2013

IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Advanced Linked						
Data -	Format	pe : Whole Number ~ : General ~ 6 호 값을 많은	2↓ Z↓ Clear All Sort by Filters Column ≠ Sort and Filter	Find		Diagram View Show Hidden Calculation Area View	
Geograph		Formatting	Sort and Fliter	Find	Calculations	view	:
GeographyKey 💽	GeographyType	ContinentNam	ne 🔽 CityName	🔽 Sta	teProvinceName	e 🔽 RegionCountryNam	
_	Continent	Europe					00
_	Continent	North America	1				00
	Country/Region	Asia				Armenia	0(
	Country/Region	Asia				Australia	03
	Country/Region	Asia				Bhutan	C
272	Country/Region	Asia				China	00
273	Country/Region	Asia				India	10
274	Country/Region	Asia				Iran	00
275	Country/Region	Asia				Japan	00
276	Country/Region	Asia				Kyrgyzstan	4(
277	Country/Region	Asia				Pakistan	EC
278	Country/Region	Asia				Singapore	
279	Country/Region	Asia				South Korea	
280	Country/Region	Asia				Syria	OF
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🎟 Geography
GeographyKey
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🗉 LoadDate
🗇 UpdateDate



Technology Support ShortCourses IT Division Texas Tech University

Creating a Power View report

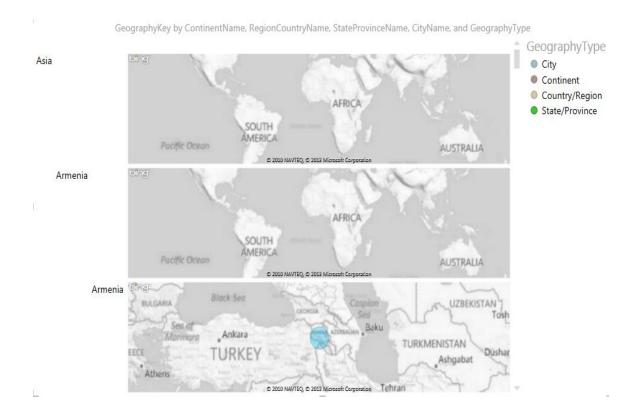
pening Power View	
Working on opening Power View sheet	
	Cancel

PivotTable reports are not the only type of report that benefits from a **Data Model**. Using the same model you just built, you can add a **Power View sheet** to try out some of the layouts it provides.

- In Excel, click **Insert** -> **Power View**.
- In **Power View Fields**, click the **arrow** next to the **FactSales** table, and click **SalesAmount** (click ALL to see all tables).
- Expand the **Geography** table and click **RegionCountryName**.
- In the ribbon, click Map (Design tab -> Switch visualization). A map report appears.
- Drag a corner to resize it. On the map, blue circles of varying size indicate sales performance for different countries or regions.

Power View Fields	<
ACTIVE ALL	Power View Fields ×
▲ FactSales □ ∑	ACTIVE ALL ▷ III DimChannel ▷ III DimDate ▷ III DimProduct ▷ III DimProductSubcategory ▷ III DimPromotion ▷ III FactSales ✓ CityName ✓ ContinentName ▷ ETLoadID ✓ GeographyKey ✓ GeographyKey ✓ GeographyType □ Geometry □ LoadDate ✓ StateProvinceName □ UpdateDate ▷ III Table_ProductCategories.accdb

Map



Recommended Online Resources

- Online Video Training Library http://library.ttu.edu/lynda
- Safari eBooks Online <u>http://library.ttu.edu</u>
 - **Excel 2013 In Depth**, by: Bill Jelen, January 24, 2013
 - Excel 2013 Pivot Table Data Crunching, by: Michael Alexander, January 16, 2013
 - **Microsoft Excel 2010: Data Analysis and Business Modeling**, 3rd Edition, by: Wayne L. Winston, January 7, 2011

Please e-mail your questions, comments, or suggestions to heide.mansouri@ttu.edu