# **Power Pivot**

## Sample manual - first two chapters



Manual 1370 - 205 pages -

### TABLE OF CONTENTS (1 of 6)

1	GETTING STARTED WITH POWER PIVOT	Page
1.1	What is Power Pivot?	8
	The Power Pivot Workflow	8
	Enabling Power Pivot in Excel	9
	The Power Pivot Ribbon Tab	9
1.2	A Basic Power Pivot Example	10
	Step 1 – Create an Excel Table	10
	Step 2 – Add the Table to the Data Model	11
	Step 3 – Edit the Data Model	12
	Step 4 – Create a Report	12
	Step 5 – Build the Pivot Table	13

2	DATA MODELS	Page
2.1	Building Data Models	14
	Our Example Data Model Our Example Data	14 15
2.2	Importing Data	16
	Which Application to Use	16
2.3	Importing Data in Power Pivot	17
	Step 1 - Choose to Import from Excel Step 2 – Choose the Excel File Step 3 – Choose and Rename Tables Step 4 – Apply Filters Step 5 – Finish Importing the Data	17 17 18 18 19
2.4	Power Pivot Views	20
	The Data View The Diagram View	20 20
2.5	Editing Tables and Columns	21
	Viewing Table Properties Deleting Columns Deleting Tables Renaming Tables and Columns Changing Column Data Types Formatting Columns Setting Default Aggregations Hiding Tables and Columns	21 22 22 23 23 23 24 24
2.6	Table Relationships	24
	The Need for Relationships Detecting Relationships Creating Relationships Manually Deleting Relationships Managing Relationships	25 26 27 28 28
2.7	Refreshing a Data Model	29
	Refreshing Data in Power Pivot Refreshing Data in Excel Refreshing Data Automatically	29 29 29

3	OTHER DATA SOURCES	Page
3.1	Data Sources in Power Pivot	30
3.2	Importing from SQL Server	31
	Step 1 – Pick the Server and Database Step 2 – Choose to use Tables or a Query Step 3 – Pick and Edit Tables Writing a SQL Query Designing a SQL Query	31 31 32 32 33
3.3	Importing from Access	34
3.4	Importing from Analysis Services	35
	Connecting to Analysis Services Creating an MDX Query	35 36
3.5	Importing from Text Files	37
3.6	Importing from Reporting Services	38



### TABLE OF CONTENTS (2 of 6)

4	PIVOT TABLES	Page
4.1	Pivot Tables with Power Pivot	39
	Creating a Pivot Table from Power Pivot Building a Pivot Table	39 40
4.2	Multiple Fields	41
	Multiple Row and Column Fields Multiple Value Fields Date Fields	41 41 42
4.3	Pivot Table Values	43
	Changing the Aggregation Applying Number Formats Alternative Ways to Show Values	43 44 45
4.4	Drill Down	46
	Drilling Down Changing the Number of Rows	46 46
4.5	Formatting Pivot Tables	47
	Pivot Table Styles Displaying Subtotals Grand Totals Layout Options Blank Rows Blank Cells	47 47 48 48 49 49
4.6	Sorting Pivot Tables	50
	Sorting by Category Fields Sorting by Values Manually Sorting Items Sorting by Another Field	50 50 51 51
4.7	Filtering Pivot Tables	52
	Basic Category Filters Multiple Category Fields Applying Label Filters Filtering by Values Filter Fields	52 52 53 54 54

5	CONDITIONAL FORMATTING	Page
5.1	Conditional Formatting in Pivot Tables	55
	Adding a Conditional Format	56
	Editing Conditional Formats	57
	Clearing Conditional Formats	57
5.2	Types of Conditional Format	58
	Data Bars	58
	Icon Sets	59
	Top and Bottom Rules	59
	Above and Below Average Rules	60
	Custom Rules	60
5.2	Clearing Conditional Formats Types of Conditional Format Data Bars Icon Sets Top and Bottom Rules Above and Below Average Rules Custom Rules	

6	PIVOT CHARTS	Page
6.1	Introduction to Pivot Charts	61
6.2	Creating Pivot Charts	62
	Creating a Pivot Chart in Power Pivot Changing the Pivot Chart Type Creating a Pivot Chart in Excel	62 62 63
6.3	Editing Pivot Charts	64
	Elements of a Pivot Chart Showing and Hiding Chart Elements Adding, Removing and Moving Elements Chart Layouts	64 64 65 65
6.4	Formatting Pivot Charts	66
	Chart Colours Chart Styles Formatting Elements	66 66 67
6.5	Sorting Pivot Charts	68
	Displaying Field Buttons Sorting by Categories Sorting by Values	68 68 69
6.6	Filtering Pivot Charts	70
	Basic Category Filters Adding Filter Fields Using Label Filters Filtering by Values	70 70 71 71
6.7	Expanding and Collapsing Fields	72

7	SLICERS	Page
7.1	Introduction to Slicers	73
7.2	Creating Slicers	74
	Inserting Slicers Positioning Slicers	74 74
7.3	Using Slicers	75
	Applying and Removing Filters Selecting Multiple Items	75 75
7.4	Formatting Slicers	76
	Slicer Styles Slicer Titles Filtering Slicers	76 76 76
7.5	Timelines	77
	Creating Timelines Using a Timeline	77 77
7.6	Controlling Multiple Pivots	78
	Changing Report Connections Changing Filter Connections	78 78



### TABLE OF CONTENTS (3 of 6)

8	IMPORTING DATA WITH EXCEL	Page
8.1	Import Tools in Excel	79
	Get and Transform Data	79
8.2	Importing Excel Data	80
	Choosing an Excel File to Import Selecting Tables to Import Loading the Selected Data The Queries Created	80 80 81 81
8.3	The Data Model	82
	Building the Model What you can't do	82 83
8.4	Importing SQL Server Data	84
	Connecting to a SQL Server Database Getting Data with a SQL Query	84 85
8.5	Importing Other Files	86
	Importing a Text File Importing from a PDF File	86 87
8.6	Importing Multiple Files	88
	Choosing the Folder Combining the Files The Queries Created	88 89 89
8.7	Importing from Websites	90
	Getting Data from a Web Table Creating Tables by Example Adding More Columns	90 91 92

9	TRANSFORMING DATA	Page
9.1	Queries	93
9.2	Working with Queries	94
	Opening the Power Query Editor The Power Query Screen Default Query Steps Viewing Data at Different Steps Editing a Query Step Deleting a Query Step Adding a New Step Applying Query Changes	94 95 95 96 96 97 97
9.3	Transforming Data Changing Data Types Renaming Columns Removing Columns Removing Rows Sorting and Filtering Rows Splitting Columns Extracting Values Replacing Values Replacing Errors Duplicating Columns	99 99 99 100 100 101 101 101 102 102 102
9.4	Creating New Columns Creating a Formula Creating a Column by Example	103 103 104
9.5	Conditional Columns	105

10	DAX IN POWER PIVOT	Page
10.1	DAX in Power Pivot	106
	Calculated Columns	106
	Measures	106
	Where Else is DAX Used?	107
	Getting Help within Power Pivot	107
	Other Sources of Help	107



### **TABLE OF CONTENTS (4 of 6)**

Page

#### 11 BASIC CALCULATED COLUMNS

11.1	Calculated Columns	108
	Key Features of Calculated Columns	108
	Creating a Calculated Column	108
	Calculated Column Properties	109
	Using Calculated Columns in Excel	109
11.2	Referencing Columns and Tables	110
	Qualifying Column Names	110
	Table Names	110
	Referencing Columns in Other Tables	111
	The Related Function	111
11.3	Editing DAX Code	112
	Multiple Lines and Indenting	112
	Comments	113
	Adding Line Numbers	113

12	WORKING WITH DATA TYPES	Page
12.1	DAX Data Types	114
	Viewing a Column's Data Type	114
12.2	Working with Numbers	115
	Basic Arithmetic Controlling the Calculation Order Safely Dividing Numbers Numeric Functions	115 115 116 117
12.3	Working with Text	118
	Writing Text in Calculations Concatenating Text	118 118
12.4	Text Functions	119
	Finding and Extracting Text Replacing Text Generating Text Converting and Formatting Text	119 119 120 120
12.5	Working with Dates	121
	Entering Date and Time Values Returning the Current Date and Time Calculating Date and Time Values Calculating the Difference Between Dates	121 121 122 122
	Extracting Date Parts Formatting Dates	123 123

#### **CONDITIONAL FUNCTIONS** 13 Page 13.1 The IF Function 124 Testing a Single Condition 124 Comparison Operators 124 The IN Operator 124 Nesting IF Functions 125 Combining Logical Tests 125 The NOT Operator 125 13.2 Working with Blanks 126 Producing a Blank 126 Blank Artihmetic 126 Testing for Blanks 126 13.3 **Testing for Errors** 127 The ISERROR and IFERROR Functions 127 Avoiding Error Functions 127 13.4 The SWITCH Function 128 A Simple SWITCH Function 128 Logical Tests in a SWITCH Function 128

14	BASIC MEASURES	Page
14.1	Introduction to Measures	129
	Measures vs. Calculated Columns Implicit Measures	129 129
14.2	Creating Measures	130
	Writing a Measure in Power Pivot	130
	Using Power Pivot's AutoSum Tool	131
	Formatting Measures	131
	Creating Measures in Excel	132
	Editing Measures in Excel	132
14.3	Referencing Measures	133
14.4	Filter Context	134
	What is Filter Context?	134
	How DAX Applies Filter Context	135

15	AGGREGATION FUNCTIONS	Page
15.1	Aggregating Column Values	136
	Basic Aggregation Functions Functions for Counting Dealing with Boolean Values	136 137 137
15.2	Aggregating Expressions	138
	The AggregateX Functions	138
15.3	Iterators and Row Context	139
	A Reminder of Filter Context Row Context in Iterator Functions The Final Result How to Spot Iterators	139 140 140 140



#### TABLE OF CONTENTS (5 of 6)

16	THE CALCULATE FUNCTION	Page
16.1	Introducing the CALCULATE Function	141
	Expressions in the CALCULATE Function	141
16.2	Adding New Filters	142
	Basic Filter Expressions	142
	Adding Mutliple Filters	143
	Filter Arguments and Filter Context	143
	Multiple Columns in Filter Arguments	144
16.3	Replacing Filters	145
	Replacing an Existing Filter	145
	Comparing Differently Filtered Measures	146
	Dealing with Blank Values	146
16.4	Keeping Filters	147
	The Problem with the Default Behaviour	147
	The KEEPFILTERS Function	148
	Using the VALUES Function	148
16.5	Removing Filters	149
	Removing a Filter from a Column	149
	Comparing Filtered and Unfiltered Values	149
	Removing Filters from a Table	150
16.6	Special Filter Removal Functions	151
	The ALLEXCEPT Function	151
	The ALLSELECTED Function	152

17	VARIABLES	Page
17.1	Introduction to Variables	153
	Using Variables in Measures	153
17.2	How Variables are Evaluated	154
	Lazy Evaluation DAX Variables are Constants	154 154
17.3	Debugging with Variables	155
	Returning Different Variables	155
17.4	Nesting Variables	156
	Variables in Functions	156

18	THE FILTER FUNCTION	Page
18.1	Introduction to the FILTER Function	157
	A Basic FILTER Example Using the CALCULATE Function How CALCULATE and FILTER are Related Using Multiple Filters Using Variables	157 157 158 158 158
18.2	FILTER vs. CALCULATE	159
	Referencing Multiple Fields Referring to Measures Replacing Filters	159 160 160
18.3	The CALCULATETABLE Function	161
	Using the CALCULATETABLE Function	161

19	FILTERS AND RELATIONSHIPS	Page
19.1	Relationships and Filter Direction	162
	Filter Direction	162
	Filter Direction and Measures	162
	The CROSSFILTER Function	163

Multiple CROSSFILTER Functions

20	CONTEXT TRANSITION	Page
20.1	What is Context Transition?	165
	Row and Filter Context	165
20.2	Context Transition in Calculated Columns	166
	Row Context in Calculated Columns	166
	Performing Context Transition	166
	Implicit Context Transition	167
	The RELATED TABLE Function	107
20.3	Context Transition in Measures	168
	Row Context in Measures	168
	Context Transition in Measures	169
	The Effect of Filter Context	169
	Removing Filters	170
20.4	Ranking Values	171
	The RANKX Function	171
	Ranking in Calculated Columns	171
	Context Transition in Calculated Columns	172
	Ranking in Measures	172



164

### TABLE OF CONTENTS (6 of 6)

21	CALENDAR TABLES	Page
21.1	Introduction to Calendars	173
	The Date Column	173
21.2	Creating a Calendar Table	174
	Adding a Date Table Marking as a Date Table Creating Relationships Using a Calendar in Pivot Tables	174 174 175 175
21.3	Customising a Calendar	176
	Adding Columns Sorting Columns Hiding Columns Creating Hierarchies Updating the Date Range Saving a Custom Calendar	176 176 177 177 178 178
21.4	Multiple Date Fields	179
	Using Multiple Calendars Using a Single Calendar Changing the Active Relationship The USERELATIONSHIP Function	179 180 180 181
21.5	Special Dates	182

22	TIME INTELLIGENCE	Page
22.1	Time Intelligence	183
	Calendar Tables	183
22.2	General Time Intelligence Functions	184
	Using the DATEADD Function How DATEADD Works Using the DATESINPERIOD Function Using the Current Date Using Specific Dates	184 185 185 186 186
22.3	To Date Calculations	187
	Returning Date Ranges Calculating Running Totals Total To Date Functions Easier Running Total Calculations Specifying Year End Dates Calculating Life to Date Values	187 187 188 188 189 189
22.4	Next and Previous Periods	190
	Next and Previous Period Functions Comparing Entire Previous Years Comparing Parts of Previous Years	190 191 192
22.5	Period Start and End Dates	193
	Period Start and End Functions Start and End Dates Opening and Closing Balances First and Last Non-Blank Dates First and Last Non-Blank Values Non-Blank Opening Balances	193 194 195 195 196 196
22.6	Moving Averages	197
	Simple Moving Averages Simple Moving Averages of Sums	197 198

23	KPIS	Page
23.1	What are KPIs?	199
	Structure of a KPI	199
23.2	Creating a KPI	200
	Creating the Measures Creating the KPI Showing the KPI in a Pivot Table Editing the KPI	200 200 201 201
23.3	Absolute Targets	202



### **CHAPTER 1 - GETTING STARTED WITH POWER PIVOT**

### 1.1 What is Power Pivot?

Power Pivot is an add-in for Microsoft Excel which allows you to analyse complex data quickly and efficiently. It provides several advantages over basic Excel pivot tables, including:

Feature	Description
Multiple tables	A pivot table based on a Power Pivot data model can include columns from multiple different tables. This allows you to combine data from different sources into a single pivot table.
Table size	Tables which you load into a Power Pivot data model can have approximately 2 billion rows and columns, far exceeding the size of a table in an Excel worksheet.
Measures	You can use the DAX language to write calculations called measures in a Power Pivot data model. DAX measures allow you create much more complicated and useful calculations than you can create using Excel formulae alone.
3D maps	With a Power Pivot data model you can use Power Map to create a fancy-looking 3D map of your data!

#### The Power Pivot Workflow

To create a report using Power Pivot you tend to follow the same sequence of steps or *workflow*. You can see the basic Power Pivot workflow in the diagram below:





#### **Enabling Power Pivot in Excel**

You may need to enable the Power Pivot feature before you can use it. To do this:

- 1) From the Excel ribbon, choose **File | Options**.
- 2) On the dialog box which appears, choose **Add-ins**.



3) From the Manage: drop down list, select COM Add-ins then click Go...



4) Check the box for **Microsoft Power Pivot for Excel** and click OK

Check this box and	COM Add-ins		?	×
then click <b>UK</b> .	A <u>d</u> d-ins available:		0	
	DAX Studio Excel Add-In	~		3
	Microsoft Data Streamer for Excel		Ca	ncel
	Microsoft Power Map for Excel			
	Microsoft Power Pivot for Excel		<u>A</u> c	id

#### The Power Pivot Ribbon Tab

Once you have enabled Power Pivot you'll see an extra tab in the Excel ribbon.





### 1.2 A Basic Power Pivot Example

This section shows you the basic Power Pivot workflow using a single Excel worksheet containing sales data from a fictitious toy company called **Create a Creature**.

A	Α	В	С	D	E	F	G	н	- I	J	К	L	М	N
1	SaleId	SaleDate	Quantity	Price	PaymentDate	ProductName	Animal	Legs	WeightGrams	Productio	FamilyNa	HabitatName	Environme	CentreName
2	2	17/12/2017	1	4.5	17/12/2017	Petronella	Parakeet	2	520	4.05	Bird	Forest	Land	Grays Shopping Centre
3	10	21/12/2017	1	4.5	21/12/2017	Petronella	Parakeet	2	520	4.05	Bird	Forest	Land	The Marlands Shopping
4	13	22/12/2017	1	4.5	22/12/2017	Petronella	Parakeet	2	520	4.05	Bird	Forest	Land	West Quay Retail Park
5	15	23/12/2017	1	4.5	23/12/2017	Petronella	Parakeet	2	520	4.05	Bird	Forest	Land	The Marlands Shopping
6	16	23/12/2017	1	5	23/12/2017	Pokyo	Penguin	2	850	4.5	Bird	Salt water	Water	Grafton Centre
7	17	27/12/2017	1	4.5	27/12/2017	Petronella	Parakeet	2	520	4.05	Bird	Forest	Land	Blackburn Shopping Ce
8	18	27/12/2017	1	5	27/12/2017	Pokyo	Penguin	2	850	4.5	Bird	Salt water	Water	<b>Birtles Shopping Centre</b>
9	22	29/12/2017	1	7.99	29/12/2017	Sammy	Snake 💌	0	950	7.19	Reptile	Grasslands	Land	Thecentre:mk

Our sample data is held in a single Excel worksheet. Each row represents a sale made in one of our shops and has information about the product and location of the sale.



For this basic example, we'll create the Power Pivot data model in the workbook which contains the original data. Normally, you would import data into the data model from an external source.

#### Step 1 – Create an Excel Table

To add the data to the Power Pivot data model we first need to convert the range of cells into a formal table. To do this, select any cell in the table and from the ribbon choose **Insert | Table**.





#### Step 2 – Add the Table to the Data Model

To add your freshly created table to the Power Pivot data model, select any cell in the table and from the Excel ribbon choose **Power Pivot | Add to Data Model** 



Excel will copy the selected table into the data model and then open the Power Pivot application to show you the results.





#### Step 3 – Edit the Data Model

Editing a data model involves several different tasks. One of the simplest things you can do is assign a default format to a column. You can see how to do this in the diagram below:

a)	Select the column you want to		File	Home	Design	Advanced			
	format by clicking any cell in the column.						Data	Type : Date 👻	
			Clipboard	Cat Extern	L <b>S</b>	PivotTable	Forn	nat : *14/03/2001 13:30:5	55 -
			T	Data -		-	~	*14/03/2001 13:30:55	
								*14/03/2001	
			[SaleD	)ate]		17/12/20	)	14 March 2001	
b)	In the <b>Home</b> tab of the ribbon,	]	🖌 Salelo	i 🔽 Sa	eDate	<b>v</b> (		14/03/2001	Pay
	select the formatting you want	-	1	2 17	/12/2017 (	00:00:00		14/03/01	17/
	to apply.		2	10 21	/12/2017 (	00:00:00		March 2001	21/



Unlike in Excel, you can't format individual cells in a Power Pivot column. The entire column is treated as one object when it comes to changing formatting and other properties.

#### Step 4 – Create a Report

To create a report you can add pivot tables and charts based on the data model. To do this, from the Power Pivot ribbon choose **Home | PivotTable** and then choose what to create.





#### Step 5 – Build the Pivot Table

You can now build the pivot table by adding fields from your data model to the different areas of the pivot table. You can see how to do this in the diagram below:



You can see one of many possible configurations for this pivot table in the diagram below.

Drag fields between are	as below:	ProductName All	-			
		TownName All	<b>.</b>			
Filters	III Columns					
ProductName ~	EnvironmentName~	Sum of Quantity Colum	nn Labels 💌			
TownName ~		Row Labels 🔄 Air	Land	Water	<b>Grand Total</b>	
		Factory Outlet	124 1358	105	1587	
Rows	$\Sigma$ Values	Retail Park	871 7911	875	9657	
CentreTypeName ~	Sum of Quantity ~	Shopping Centre	4411 49954	6211	60576	
		Shopping Park	188 2143	264	2595	
		Grand Total	5594 61366	7455	74415	
			1			
Each of the fields yo the <b>PivotTable Fiel</b>	ou add to an area in <b>ds</b> pane…	is added to the appr worksheet.	opriate part of the p	pivot tab	le on the	



### **CHAPTER 2 - DATA MODELS**

### 2.1 Building Data Models

In the previous chapter you saw how to create a basic data model consisting of a single table. This chapter explains how to build a more complex data model involving multiple tables.

#### Our Example Data Model

Our data model will be based on a database of sales for our fictitious **Create a Creature** toy company. You can see a diagram of the data model we want to create in the image below:





#### **Our Example Data**

Our sample data is stored in a separate Excel file. You can see how some of the Excel data is arranged in the diagram below:

Ce	entre	CentreTy	/pe E	nvironn	nent	Farr	nily Hab	itat Product Region Sales Town	
All	Α	В	C	D	E	F	G	In this version of the <b>Create a Creature</b> file.	
1	SaleId	SaleDate	ProductId	Centreld	Quantity	Price	PaymentDate	rather than storing everything in a single	
2	2	17/12/2017	14	94	1	4.5	17/12/2017	worksheet, we've used separate sheets to	
3	10	21/12/2017	14	75	1	4.5	21/12/2017	store the different elements involved in a sale.	
4	13	22/12/2017	14	67	1	4.5	22/12/2017		
5	15	23/12/2017	14	75	1	4.5	23/12/2017		
6	16	23/12/2017	🗘 2	319	1	5	23/12/2017	The <b>Sales</b> worksheet has one row for each	
7	17	27/12/2017	14	361	1	4.5	27/12/2017	the Sales worksheet has one row for each	
8	18	27/12/2017	/ 2	307	1	5	27/12/2017	number for each sale. This type of column is	
9	22	29/12/2017	/ 1	380	1	7.99	29/12/2017	sometimes referred to as a <i>primary key</i> and	
	< >	Habit	at Product Region		gion	Sales	Town	allows us to uniquely identify each row.	

In the **ProductId** column we add the id number of the product that was sold, here it's **2**. This type of column is sometimes referred to as a *foreign key*.

The **Product** table stores each product once, using a unique id to identify it. We can look up this id to find the product's details. Id **2** corresponds to **Pokyo Penguin**.

A	Α	В	С	D	E	F	G	Н			
1	ProductId	oductId ProductName		HabitatId	Legs	FamilyId	WeightGrams	ProductionCost			
2	1	Sammy	Snake	1	0	1	950	7.19			
3	Ç2	Pokyo	Penguin	4	2	3	850	4.5			
4	3	Fenella	Frog	3	4	4	400	10.79			
5	4	4 Layla		2	\ 2	5	550	4.28			
6/	5	Dave	Dachsund	1	4	5	775	5.85			
/7	6	Kylie	Camel	5	4	5	1200	3.15			
8	7	Jeremy	Jackdaw	7	2	3	295	7.65			
9	8	Faye	Fox	6	4	\ 5	420	4.95			
	< > Habitat Product Region Sales Town + :										

A	А	В	С	D	E	
1	HabitatId	HabitatName	EnvironmentId	BackColour	ForeColour	
2	1	Grasslands	1	Light green	Black	
3	2	Forest	1	Dark green	White	
4	3	Fresh water	3	LightBlue	Dark blue	
5	<mark>ራ 4</mark>	Salt water 👞	3	#78aaf5	White	
6	5	Desert	1	#d6a740	Black	
7	6	Urban	1	#222	White	
8	7	Sky	2	#0a66f0	White	
9						
	< >	Habitat	Product F	Region Sa	ales Town	

Each product belongs to a specific habitat. We record the id number of the habitat for each product in the **Product** table. Many products can belong to one habitat.

The **Habitat** table stores each habitat once and uses a unique id number to identify each one. We can look up the id number to find the details of each habitat.



Every table in our database is connected to at least one other via an id column. Storing data in this way reduces how much repeating data we must store. It also makes it easier to update information as each item is stored only once.



### 2.2 Importing Data

To create our data model, we'll import data from the **Create a Creature** workbook into a blank Excel file.

#### Which Application to Use

You can import data into a data model using the import tools in either Excel or Power Pivot.



It doesn't really matter which tool you use as the data ends up in the same place, but each application has different advantages, as described in the table below:

Application	Description
Excel	Provides a wider range of data sources from which to import your data. The import tool allows you to use the Power Query editor for making changes to the data. You can also choose to load the imported data into an Excel table rather than just the Power Pivot data model (although it's unlikely you'll want to do this).
Power Pivot	The import tool allows you to rename tables and columns and apply basic filters as part of the import process.

In this chapter we'll use the import tool in Power Pivot. You can learn how to use Excel's import feature in a separate chapter of this manual.



The Power Query editor is such a powerful feature that Wise Owl recommend importing your data using Excel's import tools rather than Power Pivot's.



### 2.3 Importing Data in Power Pivot

To begin importing data, in a blank Excel workbook open Power Pivot by choosing **Power Pivot** | **Manage** from the Excel ribbon. You can now follow the steps shown below.

#### Step 1 - Choose to Import from Excel

To choose to import an Excel workbook, from the Power Pivot ribbon, choose **Home | From Other Sources**.

Excel File         Import data from an Excel file.	On the dialog box which appears, scroll to the bottom of the list and pick <b>Excel File</b> .
Text File Import data from a text file.	
< Back Next > Finish	Click <b>Next &gt;</b> to go the next stage of the import process.

#### Step 2 – Choose the Excel File

Choose to browse for the Excel file containing the data you want to import.

Friendly connection name:       Excel         Excel File Path:       Image: Browse         Image: Use first row as column headers.       Image: Browse         Advanced       Test Connection	Click <b>Browse</b> to open the file browser dialog box.
Open         ← → ✓ ↑	file containing rt.
Friendly connection name:       Excel Create a Creature 02         Excel File Path:       als\Power Pivot\Files used\Create a Creature 02.xlsx         Browse         Use first row as column headers.         Advanced	Check this box to indicate that the first row of each sheet contains the column headers, then click <b>Next</b> >.



#### Step 3 – Choose and Rename Tables

Select the tables you want to import from the Excel file and optionally rename them.

Tick the box next to each table	]	Tables and Views:							
that you want to import. You				Source Table	Friendly Name	Filter Details			
can tick the box at the top to	$\left \right\rangle$			Centre\$	Centre				
the list.		$\checkmark$	===	CentreType\$	CentreType				
		$\checkmark$	===	Environment\$	Environment				
		$\checkmark$		Family\$	Family				
	_	$\checkmark$	===	Habitat\$	Habitat				
You can rename each table to		$\checkmark$		Product\$	Product				
make them easier to recognise		$\checkmark$	-	Region\$	Region				
To do this, type the new name		$\checkmark$		Sales\$	Sales				
in the <b>Friendly Name</b> column.			====	Town\$	Town				

#### Step 4 – Apply Filters

You can optionally filter each table to include only the data you need in your data model.



#### Step 5 – Finish Importing the Data

The final step is to finish importing the data, as shown in the diagram below:





### 2.4 **Power Pivot Views**

You can view a data model in either the *data* view or *diagram* view. You can switch between the views in two ways, as shown in the diagram below:



#### The Data View

In the data view you can see the information contained in each table.



#### The Diagram View

The diagram view shows a picture of the relationships between the tables in your data model. If you've only just imported your data it's unlikely that you'll see any relationships yet!





### 2.5 Editing Tables and Columns

After importing data it's worth spending time editing the tables and columns to make them as easy to use as possible in your reports.



You can make these changes in either the data view or the diagram view. You may find it easier to perform different tasks in one view or the other.

#### Viewing Table Properties

You can view the properties of a table in the data model which allows you to choose which columns to import and modify the table's filters. To do this:

reate Manage ionship Relationships Properties		a) Select diagrar choose	the table in ei n view and fro <b>Design   Ta</b> l	ther the da om the ribb ble Proper	ata or oon <b>rties</b> .	b) Check or un to a column remove it fr	ncheck the box next n name to add it to or rom the table.
Relationships							
		Table Name:	Habitat			Switch to:	Table Preview $\sim$
		Connection Name:	Excel Create a Creatu	re 02			
III Habitat		Source Name: Habitat\$ ~ Refresh Preview			ew		
Habitatld		Column names from:	Source I	Model			
HabitatName		🔽 🗹 Habi 💽	🗹 Habita 🔽	🗹 En 🔽	BackC	ForeC	
EnvironmentId		1 1	Grasslands	1	Light green	Black	
		2 2	Forest	1	Dark green	White	
	]	3 3	Fresh water	3	LightBlue	Dark blue	
		4/ 4	Salt water	3	#78aaf5	White	
c) Click the drop down	1 /	5 5	Desert	1	#d6a740	Black	
list next to a column		6 6	Urban	1	#222	White	
to apply a filter to it		7 7	Sky	2	#0a66f0	White	
	]						
d) Click <b>Save</b> to apply your changes and		Clear Row Filters				La	ast Refreshed: 22/08/2024 14:14:50
							Save Cancel



You might expect to be able to view table properties by right-clicking on a table and choosing an option from the context menu, but you can't!



#### **Deleting Columns**

Rather than using the **Table Properties** dialog box, you can remove a column from a table by choosing to delete it.

Centre CentreType	ld ^		Right-click on the column you want choose <b>Delete</b> . Alternatively, select press <b>Del</b> on your keyboard.	to remove and the column and
SquareMet	Create Relationship			
III NumberUni	NumberUni       Image: Create Hierarchy         Latitude       X         Delete       Image: Create Hierarchy		Confirm	×
			Do you want to permanently delete this co	olumn from the model?
Confirm that you	want to delete the column.	]	Delete from Model	Cancel

#### **Deleting Tables**

You can remove an entire table from the data model by choosing to delete it.

Centre Centreld CentreName TownId CentreTypeId		Treate Relationship Create Hierarchy Delete		Right click on a table name and choose <b>Delete</b> . Alternatively, select the table and press <b>Del</b> on your keyboard. In the diagram view the selected table will be faded out.
Confirm X				
Do you want to permanently delete this table, including any associated measures, KPIs, and hierarchies?           Delete from Model         Cancel				Confirm that you want to delete the table from the model. If you want to get it back, you'll need to import it again.

#### **Renaming Tables and Columns**

The easiest way to rename a table or a column is to double-click its name in either the data view or the diagram view.





#### **Changing Column Data Types**

In Power Pivot the values in one column must all have the same type. Power Pivot will assign data types to columns automatically, but you can change these if you want to. To do this:





#### **Formatting Columns**

Formatting a column in the data model means that you don't have to repeatedly format it each time you add it to a pivot table or chart.

PivotTable	Data Type : Decimal Number ▼ Format : General ▼ \$ ▼ % ୨ 3.00 3.00	Select the column and use the formatting tools on the <b>Home</b> tab of the Power Pivot ribbon.		esh	PivotTable	Data Form	Type : Date ~ nat : *14/03/2001 13:30:5 *14/03/2001 13:30:55	55 -
	\$ English (United States)						*14/03/2001	
	£ English (United Kingdom)	You'll see different options					14 March 2001	
Price 💌	€Euro(€123) ರಿ	depending on the data		Sa	leDate 💌		14/03/2001	1
8.5	¥ Chinese (PRC)	type of the column. Here		04	/01/2019		14/02/01	25
0.5	CHF French (Switzerland)	we're formatting dates.		07	/01/2010	-	14/03/01	24



#### **Setting Default Aggregations**

When you add a field to a pivot table, it will be aggregated in a default way: numeric values will be summed, text values will be counted. You can change the default aggregation as shown below:



#### Hiding Tables and Columns

Wise

Owl's

Hint

You can hide columns and tables so that they don't clutter up the list of fields in Excel.



It's easiest to hide multiple fields in the diagram view. You can hold <u>Ctrl</u> and click on fields in multiple different tables in this view.

You can easily unhide any hidden tables or columns, as shown below:





### 2.6 Table Relationships

Relationships are a vital part of a data model which includes multiple tables, as this section shows!

#### The Need for Relationships

Without relationships between tables in the data model, pivot tables can produce strange results.



To produce the correct results, our pivot table must be able to filter the values of the **Quantity** column by the **Region** in which the sale was made. Without relationships, this can't work.



To show the correct result, the filter applied by the **Region** table must be able to travel, or *propagate*, to the **Sales** table. Without relationships, the filter has no route to travel along, so every region shows the grand total of the **Quantity** column.



#### **Detecting Relationships**

One way to create relationships is to ask Power Pivot to detect them automatically. For this to work, the columns involved in the relationship must meet certain criteria, as described in the table below:

Criteria	Description
Data types	The data types of the two columns must be the same and be either text or whole number.
Column names	The column names must be similar although they don't need to be identical. For example, <b>RegionId</b> , <b>Region Id</b> and <b>Region_Id</b> are similar enough for Power Pivot to infer a relationship.
Key values	Every value in the foreign key column must exist in the primary key column. For example, in the <b>Town</b> table the <b>Regionld</b> column must only contain values which exist in the <b>Regionld</b> column of the <b>Region</b> table.

To automatically detect relationships, create a pivot table using fields from different tables, then:



You can view the relationships in the diagram view of Power Pivot.





#### **Creating Relationships Manually**

If Power Pivot can't automatically detect relationships, you can create them manually. The easiest way to do this is to click and drag fields in the diagram view.



If you'd rather not click and drag, you can create a relationship using a dialog box. You can see one way to do this in the diagram below:





You can also create a relationship by choosing **Design | Create Relationship** from the Power Pivot ribbon.



#### **Deleting Relationships**

You can delete a relationship as shown in the diagram below:



#### Managing Relationships

You can see a list of all the relationships in your data model by choosing **Design | Manage Relationships** from the Power Pivot ribbon.

edit or de	create new relationshi lete and existing relat	ips using the <b>Manag</b> ionship by selecting	it and clicking the a	alog box. You can also appropriate button.	
Manage R	elationships			– 🗆 X	
Create	Edit De	elete			
Active	Table 1	Cardinality	Filter Direction	Table 2	
Yes	Centre [CentreTypeId]	Many to One (*:1)	<< To Centre	CentreType [CentreTypeId]	
Yes	Centre [TownId]	Many to One (*:1)	<< To Centre	Town [TownId]	
Yes	Habitat [EnvironmentId	<li>Many to One (*:1)</li>	<< To Habitat	Environment [EnvironmentId]	
Yes	Product [FamilyId]	Many to One (*:1)	<< To Product	Family [FamilyId]	
Yes	Product [HabitatId]	Many to One (*:1)	<< To Product	Habitat [HabitatId]	
Yes	Sales [CentreId]	Many to One (*:1)	<< To Sales	Centre [CentreId]	
Yes	Sales [ProductId]	Many to One (*:1)	<< To Sales	Product [ProductId]	
Yes	Town [RegionId]	Many to One (*:1)	<< To Town	Region [RegionId]	
Close					

The dialog box shows information about each relationship, including its type and the direction in which filters travel from one table to the other.



### 2.7 Refreshing a Data Model

If your source data changes, you'll want your data model to update to reflect those changes.

#### **Refreshing Data in Power Pivot**

In Power Pivot, you can choose to refresh a single table or every table in the data model.

	From the ribbon pick <b>Home   Refresh</b> then choose <b>Refresh</b> to refresh the table you have			Success	9
Refresh PivotTable	selected or Refresh All to refresh every table.		Deta	ails:	
				Work Item	Status
Refresh			$\bigcirc$	Centre	Success. 386 rows transferred.
		7.7		CentreType	Success. 4 rows transferred.
	A dialog box appears after the data refreshes.		$\bigcirc$	Environment	Success. 3 rows transferred.

#### **Refreshing Data in Excel**

You can choose to refresh data in Excel using the **Queries & Connections** pane. To open this pane, from the Excel ribbon choose **Data | Queries & Connections**.

Queries Connections		Select the <b>Connections</b> tab and then find the connection you want to refresh in the list below.
Excel Create a Creature 02		
Refresh	$\left  \right $	You can click this button next to the connection to refresh it. Alternatively, right-click the connection and choose <b>Refresh</b> .

#### **Refreshing Data Automatically**

You can set a connection to refresh automatically as shown in the diagram below:

Queries Connections 1 connection	In the <b>Queries &amp; Connections</b> pane, right click the connection and choose <b>Properties</b>
Excel Create a Creature 02	Descr <u>i</u> ption:
➤ Delete	Usage Definition Used In Refresh control
	Last Refreshed:
Tick the relevant boxes to control when the connection refreshes then click <b>OK</b> .	





























### What we do!

		Basic training	Advanced training	Systems / consultancy
e	Microsoft Excel VBA macros	<b>2</b> 4	<b>₹</b>	<b>2</b>
Offi	Office Scripts Microsoft Access			
BI, etc	Power BI and DAX	<u>.</u>		
Power ]	Power Apps Power Automate (both)			
	SQL	<b>2</b>	<b>2</b>	
erver	Reporting Services	<u>.</u>	<u>.</u>	201 201
QL Se	Report Builder			<b>*</b>
Ň	Integration Services	<u>.</u>	<u></u>	<u></u>
	Analysis Services			
	Visual C#	<b>1</b>	<b>2</b>	₩.
Ď	VB programming	<u>N</u>	<u>yar</u>	
Codin	MySQL			÷.
	Python			



