

CHAPTER 7

INFocus

DATA LINKING

The process of displaying or using data that resides in another cell, perhaps even in another workbook, is known as data linking.

Excel enables you to link the data in your worksheet with data in other sheets, other workbooks and even other applications.

In this session you will:

- ✓ gain an understanding of data linking
- ✓ learn how to create links between worksheets
- ✓ learn how to link between workbooks
- ✓ learn how to update links between workbooks.

UNDERSTANDING DATA LINKING

Links between worksheets and workbooks can be created in Excel by including workbook and worksheet names, as well as the cell reference, within a formula. An **internal link** refers to one

within the same file, while an **external link** refers to a link with another file. The cells referenced by a link are known as the **source** data. When source data changes, the linked cells will also change.

The Advantages of Linking Data in Excel

- linking data from one worksheet to another worksheet ensures that the core data is entered or calculated only once and then shared with other files
- you can develop a large system using smaller, more manageable worksheets and workbooks
- linked workbooks do not all need to be open for the links to be updated, freeing memory for other activities
- separate modules can be created and managed by different people

The Syntax of a Link

A typical link has the following structure:

=drive:\path\[filename]worksheet name!cell reference

The full path name is only displayed when the source file is not opened.

Sample of Internal and External Links

Internal links to two other worksheets in the same workbook

External link to an open workbook

External link to a closed workbook

Expense Type		2010				
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total	
Wages	17878	13374	15213	17981	64,446	
Raw Materials	27157	179827	142946	222252	572,182	
Freight	269	18902	1796	9681	30,648	
Direct Costs	45,304	212,103	159,955	249,914	667,276	
	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total	
Telephones	567	618	628	2757	4570	
Postage	618	1069	465	4044	6196	
Stationary	172	116	165	106	559	
Motor Vehicles	2255	2245	1632	2306	8438	
Entertainment	1693	1693	1743	1686	6815	
Overheads	5305	5741	4633	10899	26578	
Total	50,609	217,844	164,588	260,813	693,854	

Formula Bar: B8 =Communications!B8+Electronics!B8
 +'[Tools Expenses.xlsx]Tools'!B8
 +'C:\Course Files for Excel 2010\[Life Style Expenses.xlsx]Life Style'!B8

Worksheet Tabs: Expense Summary, Communications, Electronics

LINKING BETWEEN WORKSHEETS

You can **link cells between worksheets** in a workbook by preceding the source cell reference in the formula with the sheet name, followed by an exclamation mark. For example, if you want to

work with cell **B6** in the **Accounts** sheet, your reference to the cell would be **Accounts!B6**. A common use for this technique is to create a summary sheet of other sheets in a workbook.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file E837 Linking_1.xlsx...

1

Examine the workbook

This worksheet contains data for three years on separate worksheets and a summary page at the front...

2

Click on cell **B6** and type =

3

Click on the worksheet tab for **Year2009** and click on **F6**

4

Press **Enter** to complete the formula

Let's try another technique...

5

Click on **B8**, type **=Year2008!E4** and press **Enter**

You can add multiple references with a plus sign...

6

Click on **B13** and use the technique in steps 2 and 3 to build the formula:

=Year2008!F4+Year2009!F4+Year2010!F4

7

Press **Enter** then click on **B15** and type the formula:

=Year2008!F8+Year2009!F8+Year2010!F8

8

Press **Enter**

3

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
ons	\$431,201	\$401,266	\$399,500	\$422,500	\$1,654,467
s	\$88,155	\$91,544	\$95,688	\$101,122	\$376,509
l Services	\$55,699	\$61,456	\$59,646	\$75,666	\$252,467
	\$575,055	\$554,266	\$554,834	\$599,288	\$2,283,443

6

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
ons	\$675,050	\$750,521	\$801,199	\$799,644	\$3,026,414
es	\$255,401	\$275,401	\$301,555	\$252,987	\$1,085,344
l Services	\$125,950	\$132,465	\$141,522	\$166,488	\$566,425
	\$1,056,401	\$1,158,387	\$1,244,276	\$1,219,119	\$4,678,183

8

	A	B	C
1	AGE	Summary Statistics: All Product Lines	
2			
3			
4	Single Cell Linking		
5			
6	Total Environmental Services - 2009		252467
7			
8	4th Qtr Communications - 2008		235405
9			
10			
11	Multiple Cell Linking		
12			
13	Total Communications - All Years		5528387
14			
15	Grand Total All Areas - All Years		8186727
16			
17			

For Your Reference...

To **create a link between worksheets**:

1. Type as much of the formula as is required before the linked cell reference
2. Click on the cell or type the reference
3. Press **Enter** or continue with the formula

Handy to Know...

- When creating links in a workbook, although clicking on each cell to pick up the reference may seem tedious, it guarantees the accuracy of the reference and therefore your formula.

LINKING BETWEEN WORKBOOKS



Linking between workbooks involves the same basic steps as linking between worksheets within a workbook. In addition, the linking formula must be very specific so that Excel can find the file that

you want to link to. If the workbook resides in another folder, the formula must include the full path to the workbook file. Workbook names need to be enclosed in square brackets.

Try This Yourself:


Same File

Continue using the previous file with this exercise, or open the file *E837 Linking_2.xlsx*...

- 1 Press **Ctrl** + **N** to create a new workbook
 - 2 Enter the headings as shown, then click on **A5** and type **=**
 - 3 Click on the **View** tab of the **Ribbon**, click on **Switch Windows**  and select **2 E837 Linking_2.xls**
 - 4 Click on the **Year2010** worksheet tab and click on **B8**
 - 5 Type ***39%** and press **Enter**
 - 6 Click on **A5** and examine the formula
- We need to make the cell reference relative so we can fill the formula to other cells...*
- 7 Double-click on **\$B\$8** in the formula bar, type **B8** and press **Enter**
 - 8 Click on **A5** then drag the fill handle to copy the formula across to **D5**
 - 9 Click on the **Home** tab and click on **Comma Style**  to format the numbers

	A	B	C	D	E	F	G	H
1	Taxation Report							
2	2010							
3								
4	Qtr 1	Qtr 2	Qtr 3	Qtr 4				
5								
6								
7								

2

	A	B	C	D	E	F
1		Yearly Income - 2010				
2						
3		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total
4	Communications	\$675,050	\$750,521	\$801,199	\$799,644	\$3,026,414
5	Health Services	\$255,401	\$275,401	\$301,555	\$252,987	\$1,085,344
6	Environmental Services	\$125,950	\$132,465	\$141,522	\$166,488	\$566,425
7						
8	Total	\$1,056,401	\$1,158,387	\$1,244,276	\$1,219,119	\$4,678,183
9						

4

	A	B	C	D	E	F	G	H
1	Taxation Report							
2	2010							
3								
4	Qtr 1	Qtr 2	Qtr 3	Qtr 4				
5	411996.4							
6								
7								

6

='[E837 Linking_2.xlsx]Year2010'!B8*39%

The linked reference contains the file and worksheet name, plus the cell reference (\$B\$8) as an absolute reference...

For Your Reference...

To **link between workbooks**:

1. Type as much of the formula as is required before the linked cell reference
2. Switch to the other workbook and click on the cell(s)
3. Press **Enter** or continue with the formula

Handy to Know...

- Links to cells in other workbooks are automatically absolute (i.e. displayed with \$ signs). This means that if you copy the formula, the column and row references will remain unchanged. You must remove the dollar signs first if you want to fill the formula to other cells.

UPDATING LINKS BETWEEN WORKBOOKS

The workbook that contains the original data is known as the **source** workbook. The workbook that contains the link formula is known as the **destination** workbook. When the source is open,

the destination workbook is automatically **updated**. If you open the destination workbook when the source is closed, you can **update** it from the source immediately or update it later.


Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file **E837 Linking_3.xlsx...**

- 1 Click on the worksheet tab for **Year2010**
- 2 Click on **B4**, type **678000** and press **Enter** to change the data
- 3 Press **Ctrl** + **S** to save the workbook, then press **Ctrl** + **W** to close it
- 4 Click on the **File** tab and select **Open**, then open **Workbook Linking.xls**

As this file contains links to an unopened file, a **Security Warning** will appear above the formula bar...

- 5 Click on the **Data** tab of the **Ribbon**, then click on **Edit Links**  to display the **Edit Links** dialog box


- 6 Click on **[Update Values]**

The status of the source workbook changes to **OK** – for more than one link, you would need to repeat this step...

- 7 Click on **[Close]**

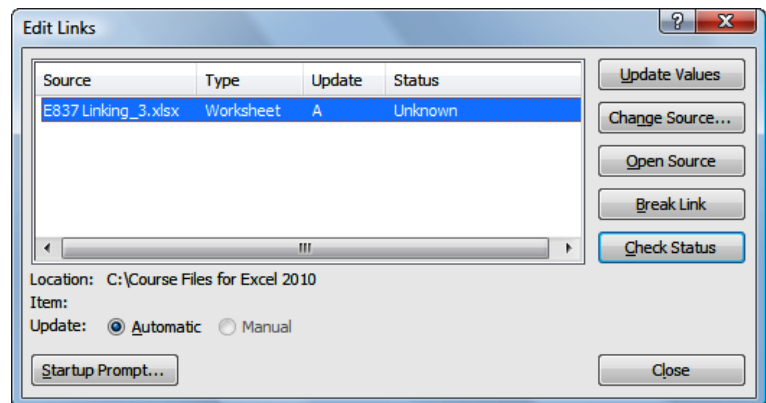
The figure for Qtr1 now reflects the change

Security Warning Automatic update of links has been disabled **Enable Content**

A5  ='C:\Course Files for Excel 2010\[E837 Linking_3.xlsx]Year2010!B8

	A	B	C	D	E	F	G	H
1	Taxation Report							
2	2010							
3								
4	Qtr 1	Qtr 2	Qtr 3	Qtr 4				
5	411,996.39	451,770.93	485,267.64	475,456.41				
6								
7								

4




5

	A	B	C	D	E	F	G	H
1	Taxation Report							
2	2010							
3								
4	Qtr 1	Qtr 2	Qtr 3	Qtr 4				
5	413,146.89	451,770.93	485,267.64	475,456.41				
6								
7								

7

For Your Reference...

To **update links** between workbooks:

1. Open the destination workbook
2. On the **Data** tab, click on **Edit Links** 
3. Click on the link to update
4. Click on **[Update Values]**
5. Click on **[Close]**

Handy to Know...

- When you open a workbook with links to a closed workbook, you can click on **[Options]** in the **Security Warning** and click on **Enable this content** to update the links – this is an alternate method to using the **Edit Links** dialog box and will update all links simultaneously.

NOTES:

[illegible]