

Microsoft Excel Pivot Tables

General instructions with
exercises on BI4Dynamics data

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1 PREFACE

1.1 How to use this document

This document's purpose is to empower BI4Dynamics users to fully benefit from BI4Dynamics (as a source of data) and Microsoft Excel (as a viewing data software). This document is presented in two parts:

Part 1: How to use prebuilt Excel reports made on top of BI4Dynamics

For easier start BI4Dynamics created set of predefined reports that can be connected to Analysis data base that is created with BI4Dynamics installation Wizard. Please note that you need successfully complete the installation to use prebuilt reports.

Part 2: Excel exercises for creating your own reports and getting most of BI4Dynamics

As every company has its own needs and challenges BI4Dynamics delivers all you can imagine content that can be used for analysis. With drag and drop Pivot table functionality you have unlimited potential of building reports.

1.2 BI4Dynamics

BI4Dynamics is complete Business Intelligence solution that is specially build for Microsoft Dynamics AX & NAV. BI4Dynamics covers all Microsoft Dynamics AX & NAV application areas and includes numerous built-in calculations for endless analysis possibilities. F.e. BI4Dynamics NAV Sales module alone offers 254 measures, 37 dimensions and 137 attributes.

It is open and completely customizable and it also serves as a framework on which you can extend the solution to fit your needs. Customization Wizard enables building new cubes, modifying built-in cubes and adjusting setup.

As BI4Dynamics main focus is transforming your data into knowledge by storing your data into Data Warehouse and creating advanced calculations to empower you with the data and unique version of the truth that is available to your entire organization. To learn how to use it in best possible way we created this guide about using Excel Pivot table.

2 INTRODUCTION

2.1 Understanding dimensions and cubes

In this chapter, the difference between cubes, dimensions, attributes and hierarchies are presented.

- Every cube is composed of different dimensions and different set of measures.
- Dimension consists of single attributes that are grouped in predefined hierarchy.
- Hierarchies have the possibility to drilldown by levels thus making it easier for the business to quickly analyze the granular data.
- Many attributes are visible and many more are hidden. They can be made visible via the BI4Dynamics customization wizard or by modification of properties in Microsoft Analysis Server (cube).

Example:

Hierarchy	Attribute	Mesures
Row Labels	Item Vendor	Stock Quantity, Stock Value, Stock Rotation Days
SPORT		11,632.00, 170,561.53, 24.69
BIKE		363.00, 73,424.90, 13.13
1000 - Bicycle	11 - London Postmaster	64.00, 50,204.00, 15.65
1001 - Touring Bicycle	11 - London Postmaster	299.00, 23,220.90, 8.83
BIKE PART		11,269.00, 97,136.63, 517.58
FURNITURE		26,930.00, 4,031,625.49, 566.02
HARDWARE		81,042.00, 605,891.08, 718.67
SOFTWARE		7,088.00, 3,417,730.88, 527.80
Grand Total		126,692.00, 8,225,808.98, 343.44

Picture: Item Category Group by measures: Stock Quantity, Stock Value, Stock Rotation Days.

Measures can be viewed over different dimensions and their hierarchies or attributes.

2.2 General features of BI4Dynamics

2.2.1 One Installation, Any Database, Any Company,

BI4Dynamics can join data across any supported version of Microsoft Dynamics NAV database and company within – in one single data warehouse.

2.2.2 Global dimensions

Each measure in a specific OLAP cube can be viewed over multiple companies and over eight global dimensions.

2.2.3 Local currency, additional currency, posting currency

Standard measures are in local currency. BI4Dynamics NAV supports by default one additional currency that is calculated in data warehouse with the information from currency exchange rate data in Microsoft Dynamics NAV. The measures for additional currencies have an ACY suffix. Measures with suffix of PCY have values in original currency posted. Such measures should always be analyzed with dimension Currency to avoid incorrect totals.

2.2.4 One Installation, Any Language

Translations for all languages are available in every cube. Users can set-up local connection string (in Excel) with Locale ID and change the display language in BI client (Excel).

2.3 Pivot Tables

Pivot tables can be seen as a simplification of the more complete and complex OLAP concepts. In other words they are your best choice when dealing with multidimensional data stored in OLAP cubes.

The most used tool to work with pivot tables is Microsoft Excel.

3 CONNECTING TO DATA

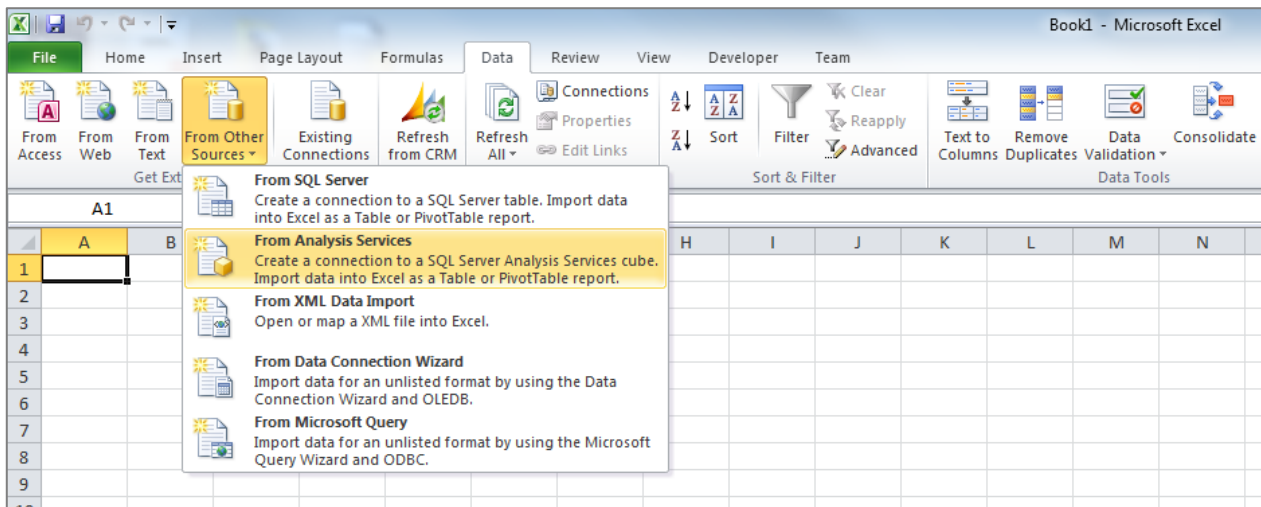
Data is the base of every analysis and we will use Excel to connect to the OLAP cubes, where the data is stored and prepared for the business user.

OLAP cubes reside on the SQL Analysis Services Server, so in order to get to the data, we first need to connect to the server.

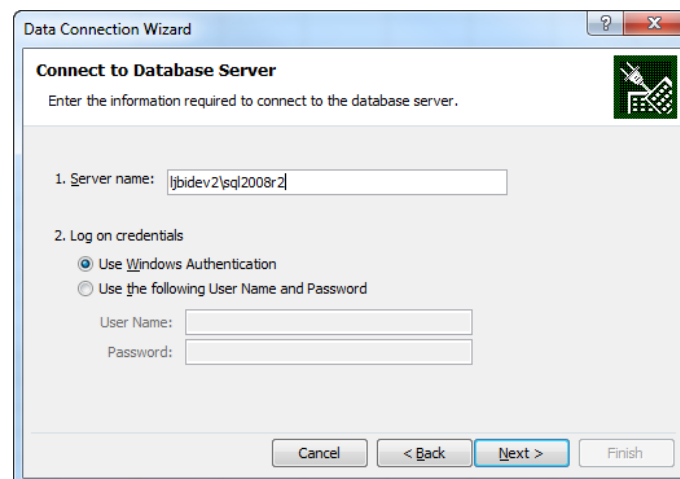
3.1 Creating a new Connection

Procedure for connecting to OLAP cubes on Analysis Services is as follows:

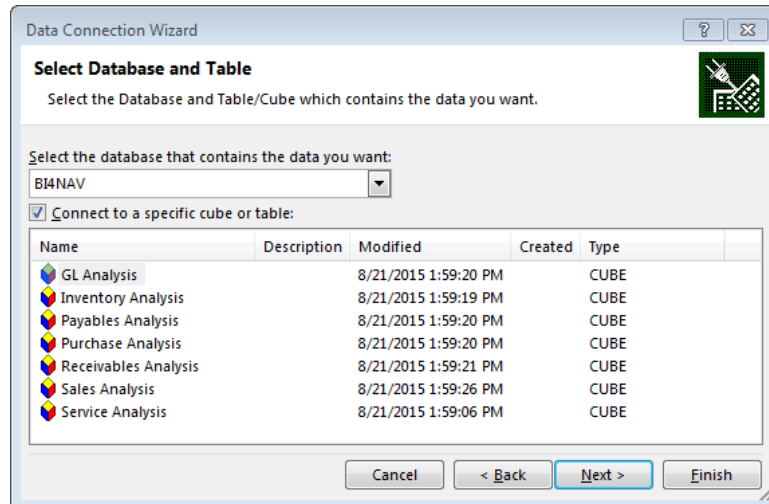
Go to: *Data >> Get External Data >> From Other Sources >> From Analysis Services*



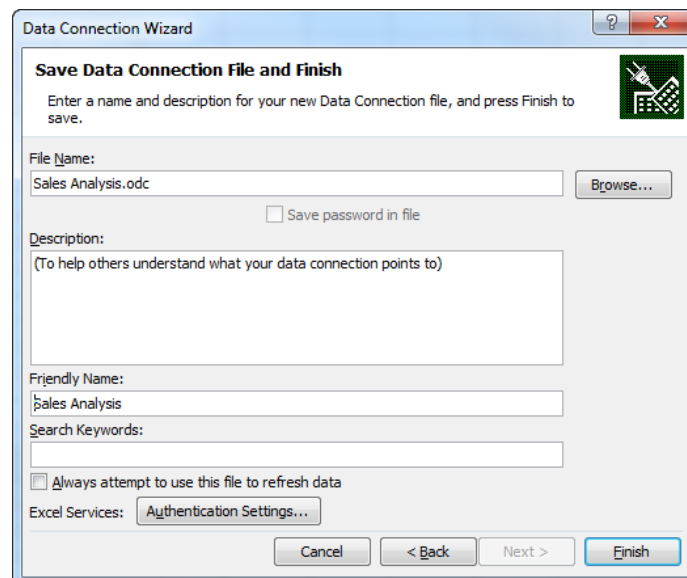
In Connect to Database Server window write your server name. Choose Windows or User authentication. Press *Next*.



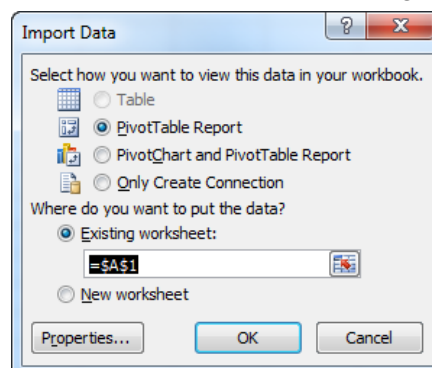
In Database and Table window choose your database and select designated cube. Press *Next*.



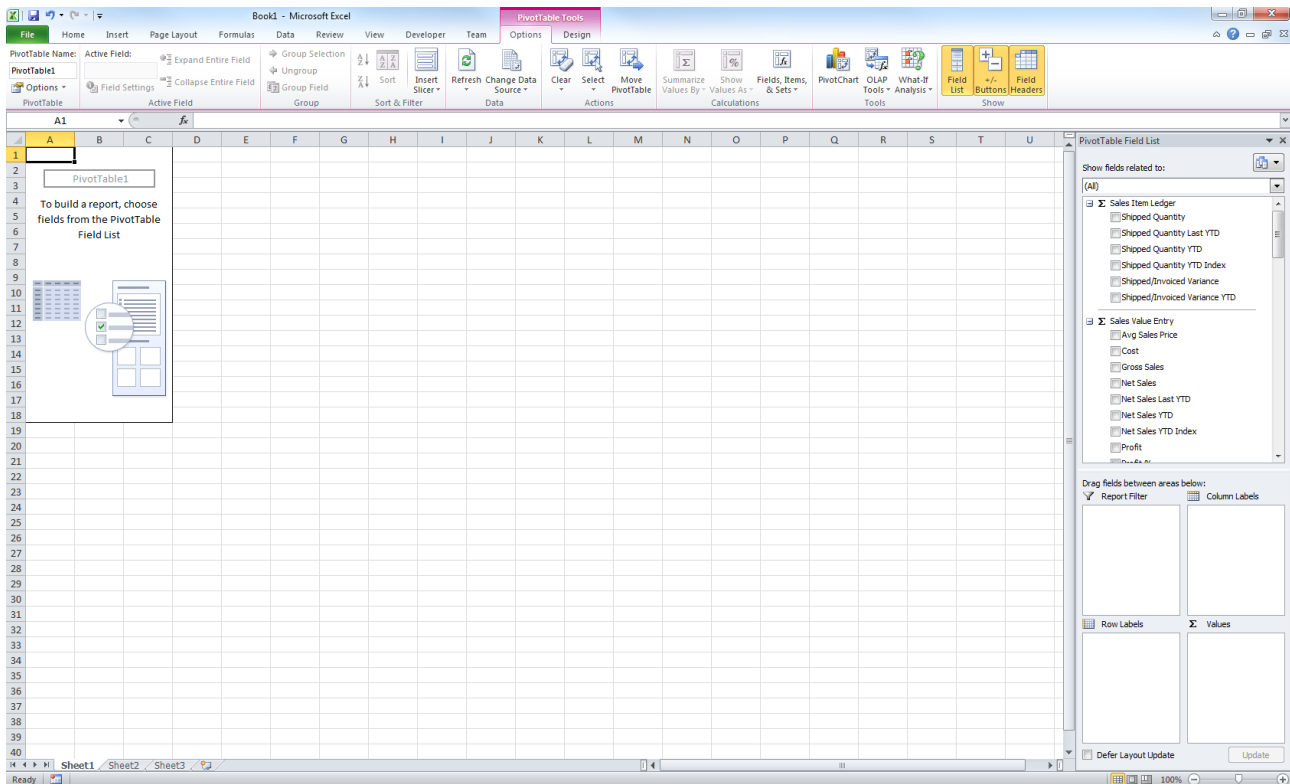
In Save Data Connection and Finish window choose the file name for your data connection. We recommend you also fill in *Description*, *Friendly Name* and *Search Keywords* fields. Press *Finish*.



As an optional last step you can also select where and what you want to create based on this connection (*Pivot Table Report* – pivot table, *Pivot Chart and Pivot Table Report* – pivot chart and pivot table, *Only Create Connection* – Create connection, *Existing worksheet*, *New worksheet*)



You are now left with a blank pivot table placeholder, pivot table field list and pivot table tools tabs. Also a new connection file has been created on your file system (by default C:\Users\YOUR USERNAME\Documents\My Data Sources).



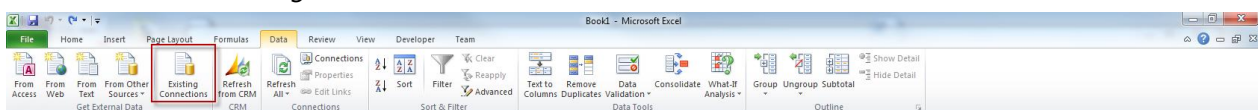
3.2 Using an existing connection

Whenever you create a new connection or receive a connection file from someone else, it is available for you to use, without having to go through the process in the previous step.

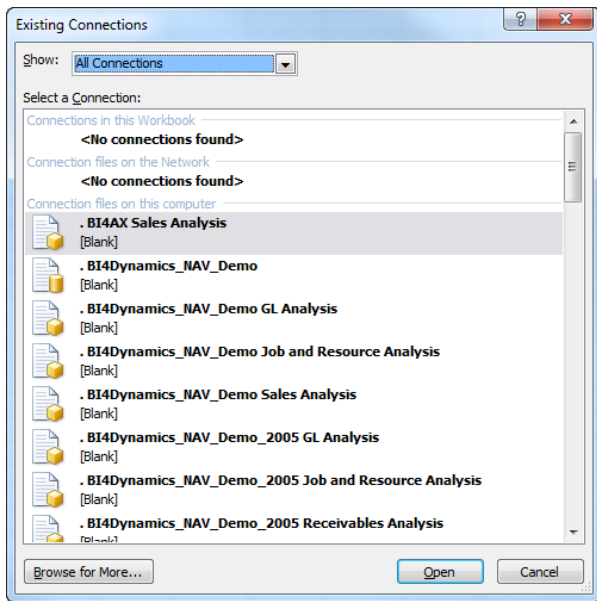
For example, your administrator could define the connection, save it on your network and you can use it create your reports.

Procedure for connecting to OLAP cubes based on an existing connection:

Go to: *Data > > Existing Connections*



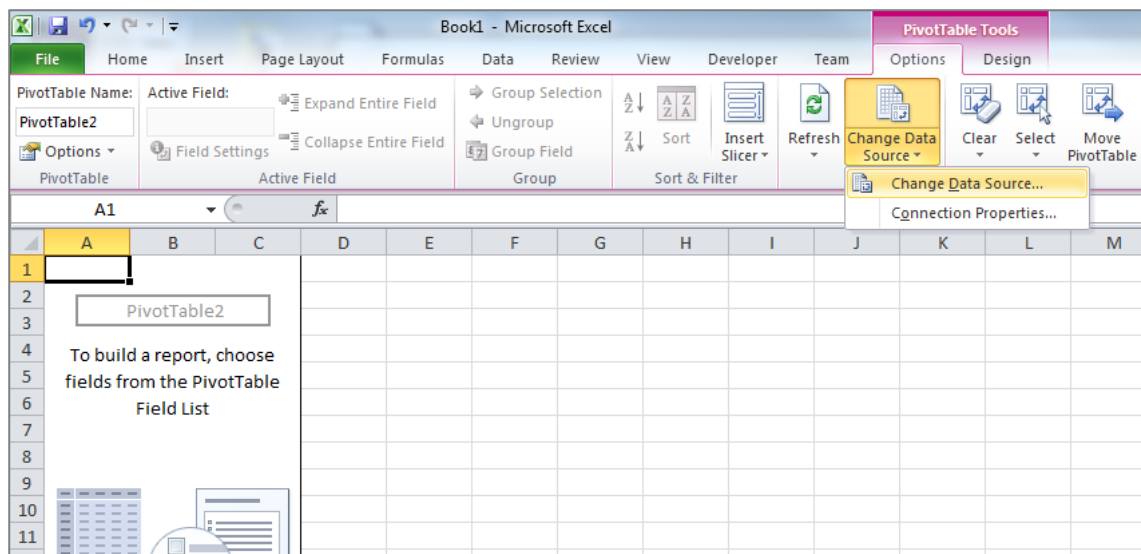
In the next windows you can choose which of the existing connection files you want to use.



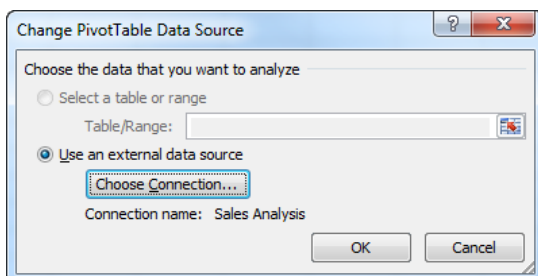
3.3 Changing an existing report connection

Once you create a pivot table that pivot table will be associated with a connection. You can always change the connection the pivot table uses.

Go to: *PivotTable Tools >> Change Data Source*



Then in the next window click Choose Connection and select the connection you want to use.



3.4 Refreshing a connection

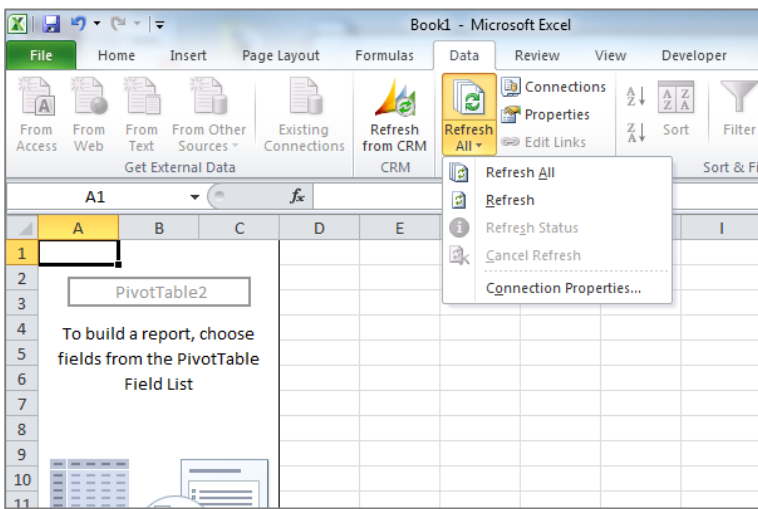
To refresh the data, you need to refresh the connection which effectively connects to the OLAP cube and returns the latest data available.

One connection can only be linked to a single OLAP cube. You can however have several connections in a workbook, though each pivot table can only be based on a single connection.

You can

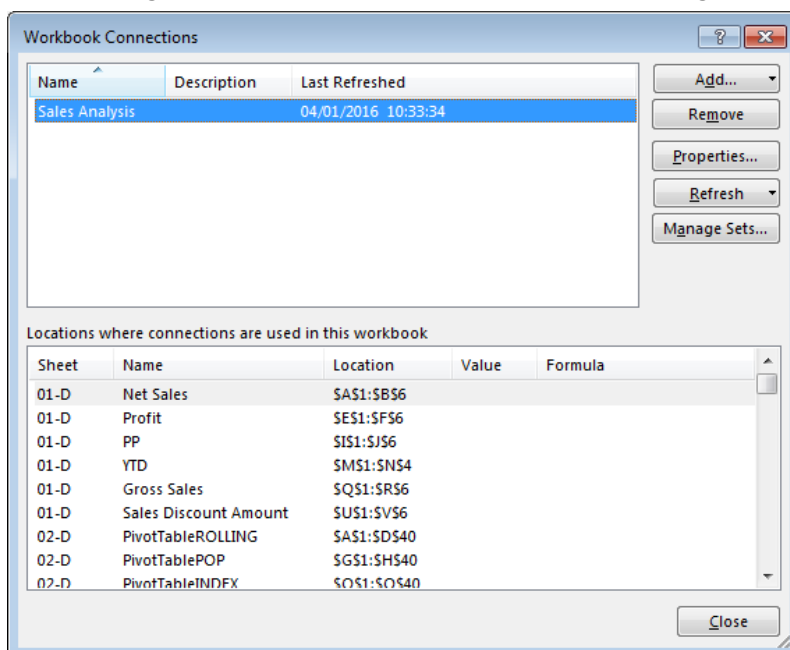
- Refresh individual connections (Refresh) or
- Refresh all connections at once (Refresh All).

Go to: *Data >> Refresh All (or Refresh)*



3.5 Connection properties

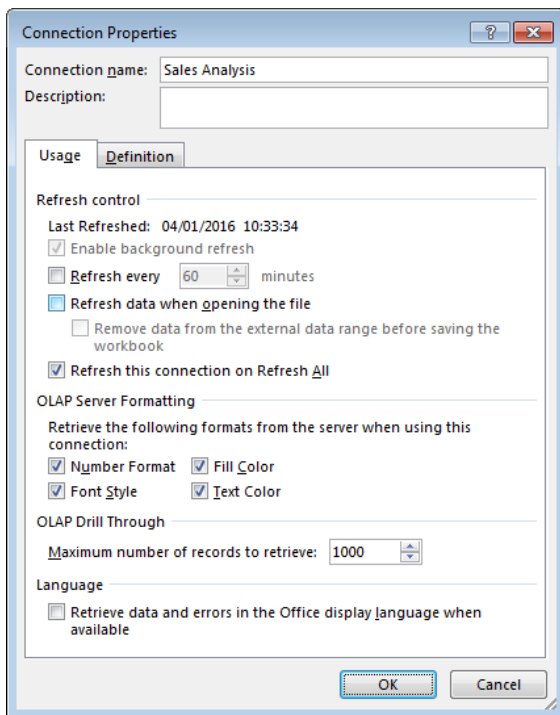
Each individual connection has several properties you can set. To view the list of all connections in a workbook go to *Data >> Connections*, which will bring up the Workbook Connections windows.



Besides having the option to also create, delete and refresh individual connections from this window, you can click on properties button to bring out the properties of the chosen connection.

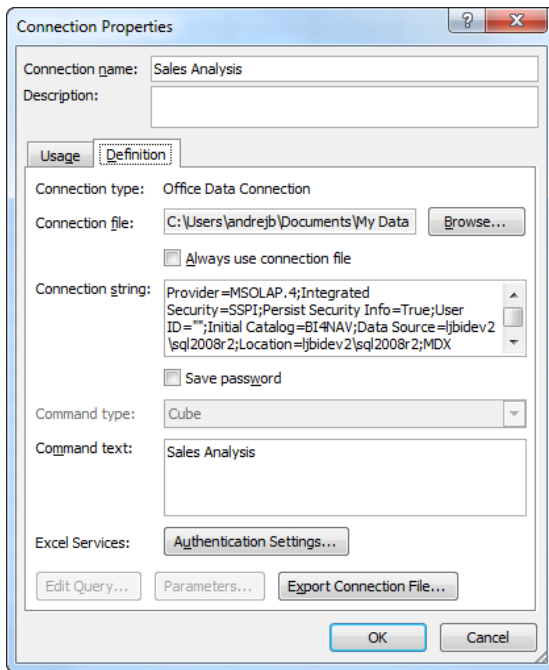
On the usage tab you can control:

1. The refresh rate of the connection:
 - Refresh every X minutes
 - Refresh data when opening the file
2. OLAP Server Formatting for numbers, fonts and colors.
3. OLAP Drill Through which controls the number of records retrieved when performing drill through (seeing the numbers behind the number).
4. Language settings, which, when available, returns the names of dimensions and measures in the language of the MS Office.



On the definition tab you can control:

1. The connection file used by the connection (which you can also change).
2. The connection string and command text (which you can also modify).
3. The Excel Services authentication settings which are important if you plan to use your Excel files with SharePoint Excel Services.



3.6 Changing language

Translations for all languages are available in every cube. Users can set-up local connection string (in Excel) with Locale ID and change the display language in BI client (Excel).

Language	Locale identifier	Connection string
Croatian	1050	Locale identifier=1050
Czech	1029	Locale identifier=1029
Danish	1030	Locale identifier=1030
Dutch - Belgium	2067	Locale identifier=2067
Dutch - Netherlands	1043	Locale identifier=1043
English - United States	1033	Locale identifier=1033
Estonian	1061	Locale identifier=1061
Finnish	1035	Locale identifier=1035
French - France	1036	Locale identifier=1036
German - Germany	1031	Locale identifier=1031
German - Switzerland	2055	Locale identifier=2055
Italian - Italy	1040	Locale identifier=1040
Lithuanian	1063	Locale identifier=1063
Norwegian (Bokmål)	1044	Locale identifier=1044
Polish	1045	Locale identifier=1045
Portuguese - Portugal	2070	Locale identifier=2070

Serbian (Cyrillic)	3098	Locale identifier=3098
Serbian (Latin)	2074	Locale identifier=2074
Slovak	1051	Locale identifier=1051
Slovenian	1060	Locale identifier=1060
Spanish - Spain (Traditional Sort)	1034	Locale identifier=1034
Swedish	1053	Locale identifier=1053

Table of available languages and locale identifiers. This feature is available on STANDARD version of Microsoft SQL server.

3.7 Exercises

3.7.1 Exercise 1 – Creating a new connection

Step 1: Select to create a new Analysis Services connection

Step 2: Connect to the server BI4NAV

Step 3: Select the BI4NAV database

Step 4: Select sales cube

Step 5: Rename you connection

Step 6: Select to create a pivot table report on the existing worksheet

3.7.2 Exercise 2 – Use an existing connection

Step 1: Select to use existing connection

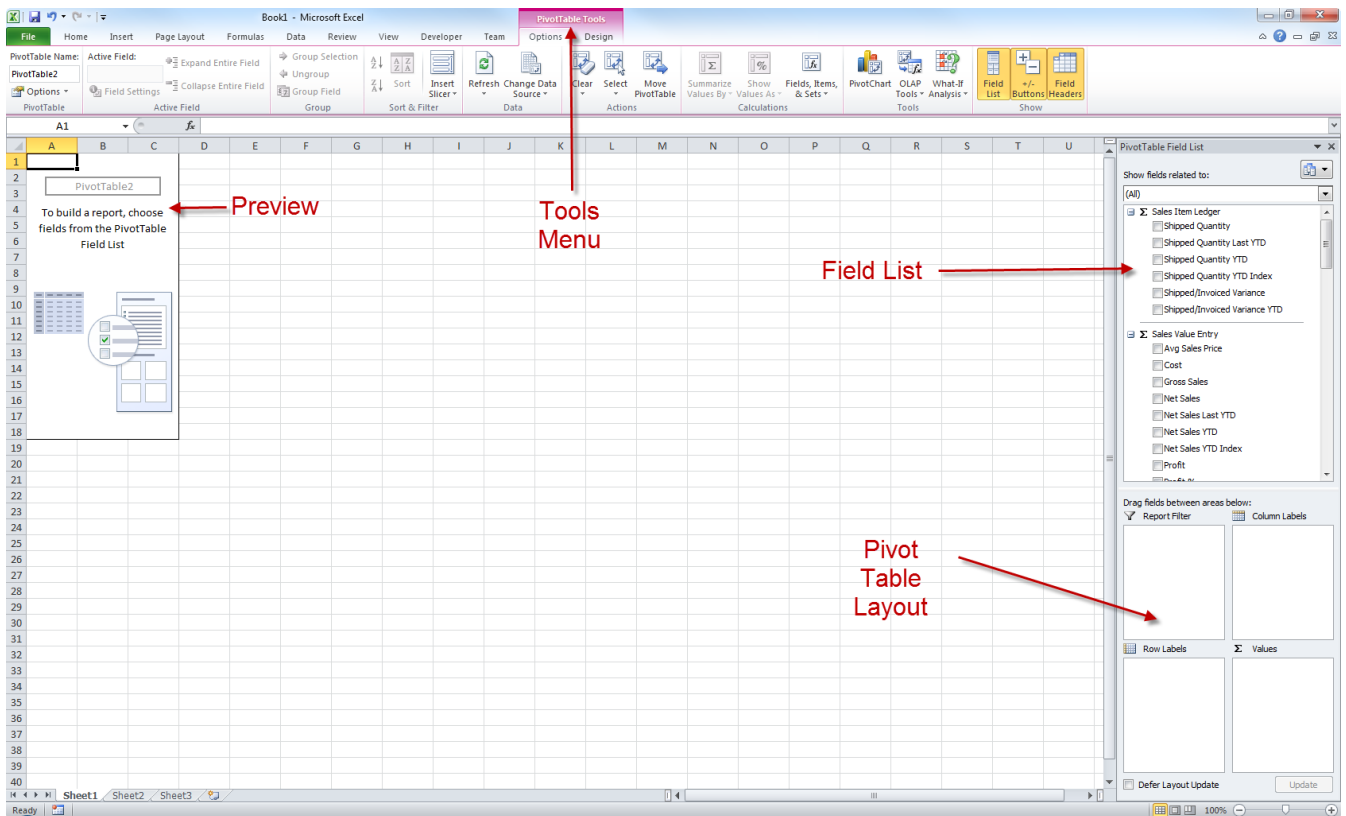
Step 2: Select the connection you created in the previous exercise

Step 3: Select to create a pivot table report on the existing worksheet

4 PIVOT TABLE OVERVIEW

In Excel, a pivot table has 3 unique parts:

- Pivot table field list, which shows the structure of the OLAP cube at the top and provides placeholders for the desired layout of your pivot table.
- Pivot table preview, where the pivot table will be created.
- PivotTable tools tabs in main menu, where you can find various options to modify your pivot table.



4.1 Show fields related to area

Areas in Sales cube are:

- Sales Budgets
- Sales Values
- Sales Quantities
- Sales Orders
- Sales Delivery

4.2 Pivot table field list

Pivot table field list contains dimension and measures.

By checking checkboxes we filter the data cube.

Checked attributes are automatically positioned in pivot table rows and columns. This can be done manually by dragging and dropping the attribute into *Column Labels*, *Row Labels*, and *Values* in *Report Filters*.

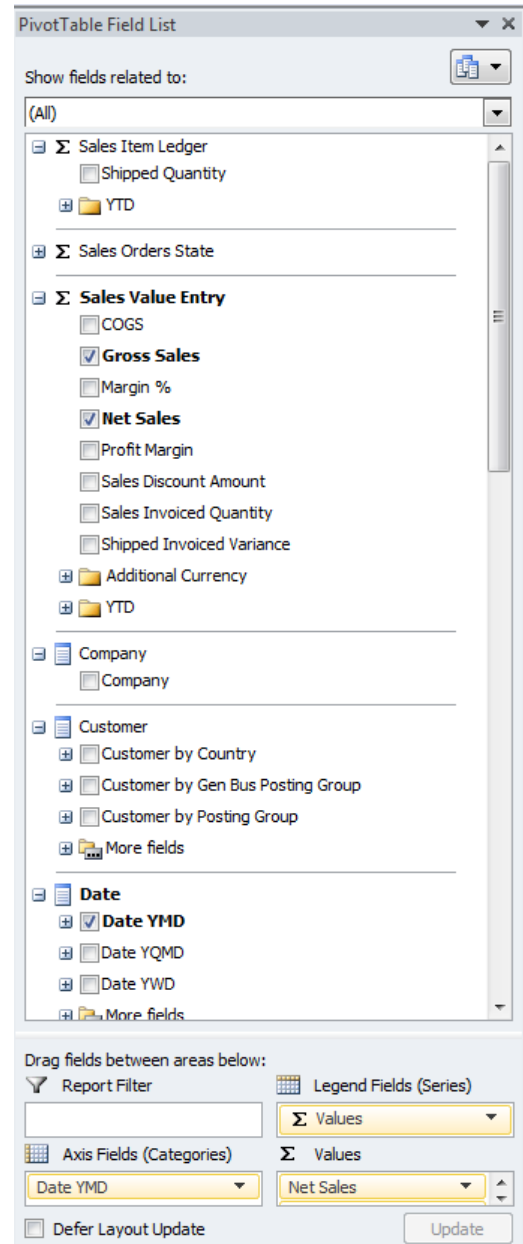
For each dimension we can examine its hierarchy by clicking on +.

Filters can be added to reports in *Report Filter*.

Top – MEASURES

Bottom – DIMENSIONS

Sort is alphabetical



4.3 Pivot table preview

Pivot table preview is divided in data description (dimensions) part and data value part.

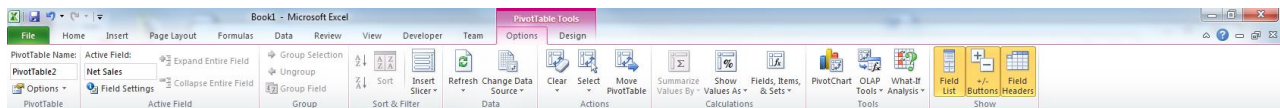
Data description part contains:

- Header filter (global data filter),
- Row filter (filter applied on rows) and
- Column filter (filter applied on columns).

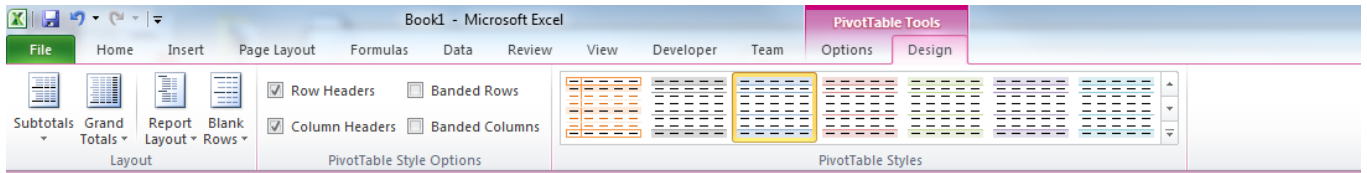
Net Sales		Column Labels				
Row Labels	FURNITURE	HARDWARE	N/A	SOFTWARE	SPORT	Grand Total
2008	1.815.549,96	279.703,81	365.585,23	989.735,07	2.679.200,24	6.129.774,31
2009	2.339.006,56	313.911,89	472.229,52	1.213.164,64	2.634.927,10	6.973.239,71
2010	2.844.488,28	627.680,37	650.104,50	2.619.675,67	1.270.096,10	8.012.044,92
2011	3.284.530,08	1.743.977,50	712.361,50	3.521.967,67	2.121.627,24	11.384.463,99
Grand Total	10.283.574,88	2.965.273,57	2.200.280,75	8.344.543,05	8.705.850,68	32.499.522,93

4.4 Pivot Table tools tabs

PivotTable tools tabs are automatically shown when clicking on one or more pivot table cells.



1. *Pivot Table Name* – name of pivot table.
2. *Options* – changing pivot table options.
3. *Active Field* – show active cell name.
4. *Field Settings* – changing cell settings (sum, format cell...).
5. *Expand Entire Field* – entering deeper hierarchy level of selected cell
6. *Collapse Entire Field* – exiting deeper hierarchy level of selected cell.
7. *Group Selection* – active on column and row header. Grouping data.
8. *Ungroup* – active on column and row header. Ungrouping data.
9. *Sort* – sorting data (ascending, descending,).
10. *Insert Slicer* – inserting different slicers.
11. *Refresh* – refreshing data from the data source.
12. *Change Data Source* – choose a different data source.
13. *Clear* – clear pivot table.
14. *Select* – select parts of pivot table.
15. *Move Pivot Table* – moving pivot table (into new sheet).
16. *Summarize Values By* – group data (power pivot).
17. *Show Values As* – customize pivot table values, % of total, ...
18. *Fields, Items, & Sets* – defining additional groups.
19. *Pivot Chart* – adding pivot chart.
20. *Formulas* – adding formulas.
21. *OLAP tools* – Working without a connection to OLAP cube and converting into formulas.
22. *Field List* – turn on/off data field list.
23. *+/- Buttons* – turn on/off entering into dimension hierarchies.
24. *Field Headers* – turn on/off pivot table header.



1. *Subtotals* – turn on/off sum, moving sum in the top or bottom of the table. Sum of selected dimension values.
2. *Grand Totals* – turn on/off sum total and preview the sum for either column or row values. Partial sum of all dimension values.
3. *Report Layout* – different report layouts.
4. *Blank Rows* – turn on/off blank rows in dimensions.
5. *Row Headers* – selecting row header color.
6. *Column Headers* – selecting column header color.
7. *Banded Rows* – even rows in other color.
8. *Banded Columns* – even columns in other color.
9. *Pivot Table Styles* – Setting pivot table appearance.

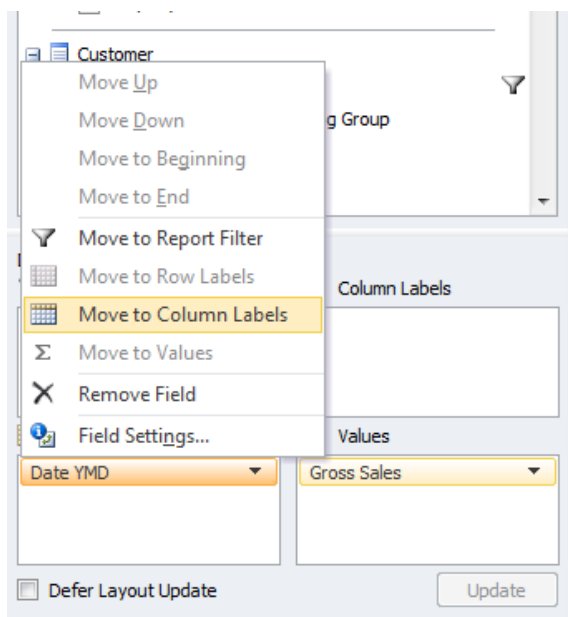
5 WORKING WITH PIVOT TABLES

5.1 Creating, modifying and deleting the pivot table layout

The first thing we need to do before designing our pivot table is to think about which dimensions and measures we are going to need.

Once we have identified them, we can select or just drag & drop them to the desired location in our pivot table. The fields will be shown automatically in the pivot table preview.

We can rearrange, add or remove the fields from our pivot table at any time by dragging and dropping or by using the arrow buttons and selecting the action from the contextual menu that comes up.



Click on the arrow next to *Date YMD* and select *Move to Column Labels*. Dimension *Date YMD* will be moved from rows to columns.

Move to Row Labels moves dimension from columns to rows. (Row is active only if data in the column was previously selected)

We can also use **Drag and drop**.

5.2 Nesting dimensions

When we set up multiple dimensions in columns/rows, we are talking about dimension nesting. This is very useful when we want to see related information from different dimensions grouped together.

In our example we want to see how well our salespeople did within the years. In the pivot table field list we select the *Salesperson - Purchaser* dimension and drag it below the *Data YMD* dimension. The order in which dimensions appear is important, because the order defines the grouping.

Adding dimension:

The screenshot shows a report builder interface. On the left, there is a list of dimensions: 'Salesperson-Purchaser' (checked), 'Source Code', and 'Source Code'. Below this, there are two areas: 'Report Filter' and 'Column Labels'. The 'Report Filter' area is empty. The 'Column Labels' area contains 'Customer by Country'. Below these, there are two areas: 'Row Labels' and 'Values'. The 'Row Labels' area contains 'Date YMD' and 'Salesperson-Purchaser'. The 'Values' area contains 'Gross Sales'. At the bottom, there is a 'Defer Layout Update' checkbox and an 'Update' button.

Result:

Gross Sales		Column Labels	
Row Labels		GB - Great Britain	Grand Total
2006		1.441.427,43	1.441.427,43
BD - Bart Duncan		387.500,20	387.500,20
JR - John Roberts		742.268,80	742.268,80
MD - Mary A. Dempsey		57.134,60	57.134,60
PS - Peter Sadow		63.640,43	63.640,43
RL - Richard Lum		190.883,40	190.883,40
2007		1.725.571,52	1.725.571,52
BD - Bart Duncan		526.799,20	526.799,20
JR - John Roberts		823.305,50	823.305,50
MD - Mary A. Dempsey		73.369,10	73.369,10
PS - Peter Sadow		87.451,42	87.451,42
RL - Richard Lum		214.646,30	214.646,30
Grand Total		3.166.998,95	3.166.998,95

5.3 Exercises

5.3.1 Exercise 1 – Creating a new pivot table

We will create a report showing Net Sales by Customer by country over years

Step 1: Drag Customer by country to row labels

Step 2: Drag Date YQMD to columns labels

Step 3: Select Net Sales and see it being added to the Values

Net Sales		Column Labels				
Row Labels		2008	2009	2010	2011	Grand Total
AT - Austria		620.541,24	724.160,97	367.547,20	582.037,74	2.294.287,15
BE - Belgium		188.240,34	207.124,42	425.424,72	448.219,10	1.269.008,58
CA - Canada		81.724,08	77.117,91	511.295,71	904.922,09	1.575.059,79
CH - Switzerland		153.536,00	174.924,64	631.931,31	877.542,15	1.837.934,10
CZ - Czech Republic		90.970,20	109.297,05	227.643,72	347.000,44	774.911,41
DE - Germany		238.380,10	285.431,75	707.494,94	974.547,44	2.205.854,23
DK - Denmark		259.893,36	295.883,45	379.202,17	457.620,42	1.392.599,40
ES - Spain		878.450,86	215.958,97	447.637,55	661.192,95	2.203.240,33
FR - France		35.429,54	35.429,54	154.989,65	343.799,54	569.648,27
GB - Great Britain		1.917.352,52	1.709.147,93	1.148.434,54	1.852.926,09	6.627.861,08
IS - Iceland		178.742,15	221.496,78	521.555,60	513.201,94	1.434.996,47
MO - Morocco		190.071,62	1.361.566,81	303.437,94	394.204,94	2.249.281,31
MY - Malaysia		441.670,34	476.724,33	257.777,56	420.515,97	1.596.688,20
NL - Holland		90.257,48	103.734,91	204.607,74	327.265,22	725.865,35
NO - Norway		215.225,69	240.470,96	333.818,90	310.698,65	1.100.214,20
SE - Sweden		132.725,24	140.657,58	628.578,95	705.575,70	1.607.537,47
SI - Slovenia		306.977,84	368.398,37	290.750,67	463.669,32	1.429.796,20
US - USA		40.108,22	87.774,82	350.157,15	594.354,47	1.072.394,66
ZA - South Africa		69.477,49	137.938,52	119.758,90	205.169,82	532.344,73
Grand Total		6.129.774,31	6.973.239,71	8.012.044,92	11.384.463,99	32.499.522,93

5.3.2 Exercise 2 – Modify layout

Use the report you created in exercise 1 (copy the existing report to a new sheet).

Step 1: Drag the date dimension in the filter.

Step 2: Select additional measures: Cost, Profit.

Step 3: Replace customer by country dimension with Bill to customer dimension in row label

Step 4: Which Bill to Customer was the most profitable? **HINT:** (Sort on Profit from biggest to smallest)

Date YQMD	All		
Row Labels	Net Sales	Cost	Profit
22 - John Haddock Insurance Co.	1.050.254,62	262.250,37	788.004,25
36 - Gagn & Gaman	1.399.592,68	632.582,64	767.010,04
68 - Möbel Siegfried	1.169.085,66	408.088,76	760.996,90
44 - Designstudio Gmunden	1.099.247,49	376.053,39	723.194,10
57 - CP Customer Template	1.102.627,22	386.133,66	716.493,56
52 - Blanemark Hifi Shops	1.069.196,13	372.413,84	696.782,29
10 - Progressive Home Furnishings	1.005.645,45	350.694,07	654.951,38
47 - Marsholm Karmstol	1.057.984,64	455.737,72	602.246,92
64 - Klubben	1.063.966,22	490.116,21	573.850,01
56 - The Device Shop	948.908,70	385.936,04	562.972,66
60 - Hotel Pferdesee	1.084.600,87	525.257,86	559.343,01
14 - Highlights Electronics Sdn Bhd	1.044.289,58	496.888,50	547.401,08
32 - Libros S.A.	1.573.490,95	1.084.307,07	489.183,88
41 - Sonnmatt Design	968.703,58	485.518,63	483.184,95
73 - Möbel Scherrer AG	857.570,74	381.178,65	476.392,09
70 - Candoxy Canada Inc.	925.547,15	460.564,16	464.982,99
37 - MEMA Ljubljana d.o.o.	871.410,24	411.609,98	459.800,26
26 - Nieuwe Zandpoort NV	717.917,29	318.816,00	399.101,29
72 - London Candoxy Storage Campus	584.770,14	214.365,06	370.405,08
24 - Meersen Meubelen	630.615,76	281.191,61	349.424,15
74 - J & V v.o.s.	721.241,01	371.916,61	349.324,40
77 - Ravel Mřbler	669.068,72	326.494,76	342.573,96
46 - Candoxy Kontor A/S	655.344,68	314.157,89	341.186,79
65 - Englands Kontorsmöbler AB	532.760,33	207.140,42	325.619,91
67 - Afrifield Corporation	610.319,63	287.197,04	323.122,59
59 - Cronus Cardoxy Procurement	567.357,62	250.841,34	316.516,28
40 - Parmentier Boutique	533.121,47	226.540,83	306.580,64
39 - Centromerkur d.o.o.	536.182,89	237.120,96	299.061,93
28 - Lovaina Contractors	521.926,19	231.951,10	289.975,09
49 - Beef House	472.637,62	191.758,45	280.879,17

5.3.3 Exercise 3 – Nesting dimensions

Use the report you created in exercise 1 (copy the existing report to a new sheet).

Step 1: Remove the Customer by Country from the report.

Step 2: Drag Item by Category to rows.

Step 3: Drag Salesperson-Purchaser below Item by Category in rows.

Net Sales	Column Labels ▼				
Row Labels ▼	2008	2009	2010	2011	Grand Total
⊕ FURNITURE	1.815.549,96	2.339.006,56	2.844.488,28	3.284.530,08	10.283.574,88
AH - Annette Hill				57,84	57,84
BD - Bart Duncan	430.628,89	531.439,80	702.480,45	794.636,10	2.459.185,24
JR - John Roberts	495.546,38	581.207,24	637.882,51	798.293,67	2.512.929,80
LM - Linda Martin		137.610,00			137.610,00
MD - Mary A. Dempsey	475.671,70	592.749,70	720.612,30	680.504,26	2.469.537,96
N/A				10.975,93	10.975,93
PK - Peter Kozina				1.082,00	1.082,00
PS - Peter Sadow	27.746,72	35.621,79		8.302,00	71.670,51
RL - Richard Lum	385.956,27	460.378,03	783.513,02	990.678,28	2.620.525,60
⊕ HARDWARE	279.703,81	313.911,89	627.680,37	1.743.977,50	2.965.273,57
AH - Annette Hill				337.968,20	337.968,20
BD - Bart Duncan	65.606,16	78.991,61	139.566,40	139.941,26	424.105,43
JR - John Roberts	99.565,89	94.367,93	159.080,92	364.407,48	717.422,22
LM - Linda Martin				234.562,83	234.562,83
MD - Mary A. Dempsey	51.335,69	63.329,17	167.823,70	197.334,24	479.822,80
N/A				378,00	378,00
PS - Peter Sadow	985,80			255.329,40	256.315,20
RL - Richard Lum	62.210,27	77.223,18	161.209,35	214.056,09	514.698,89

6 DATA DISPLAY OPTIONS

6.1 Dimension browsing (hierarchies)

Dimension browsing is one of the most interesting pivot table features. Each dimension usually has at least one hierarchy defined. By browsing a specific dimension hierarchy we can access more detailed data in a very simple and effective way just by clicking on + next to the dimension.

The result is shown in the next picture. The procedure can be repeated until we reach the lowest hierarchy level (In our example the lowest level is day).

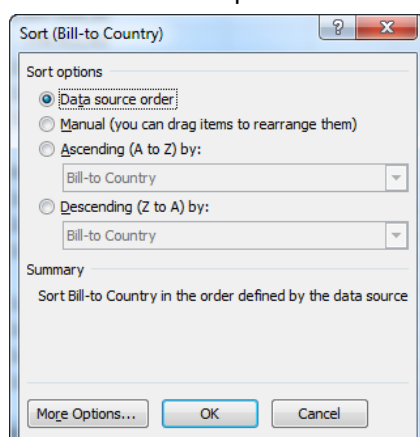
Gross Sales	Column Labels
Row Labels	GB - Great Britain
2006	1.441.427,43
2006 - Jan	37.581,78
2006 - Feb	252.961,90
2006 - Mar	76.889,00
2006 - Apr	1.644,50
2006 - May	284.932,25
2006 - Jun	92.352,90
2006 - Jul	389.600,20
2006 - Aug	10.818,80
2006 - Sep	95.913,40
2006 - Oct	97.099,70
2006 - Nov	83.563,90
2006 - Dec	18.069,10
Grand Total	1.441.427,43

Gross Sales	Column Labels
Row Labels	GB - Great Britain
2006	1.441.427,43
2006 - Jan	37.581,78
04.01.2006	6,12
07.01.2006	6.963,40
10.01.2006	649,40
12.01.2006	1.734,86
13.01.2006	15.290,40
15.01.2006	10.473,00
16.01.2006	2.464,60
2006 - Feb	252.961,90
2006 - Mar	76.889,00
2006 - Apr	1.644,50
2006 - May	284.932,25
2006 - Jun	92.352,90
2006 - Jul	389.600,20
2006 - Aug	10.818,80
2006 - Sep	95.913,40
2006 - Oct	97.099,70
2006 - Nov	83.563,90
2006 - Dec	18.069,10
Grand Total	1.441.427,43

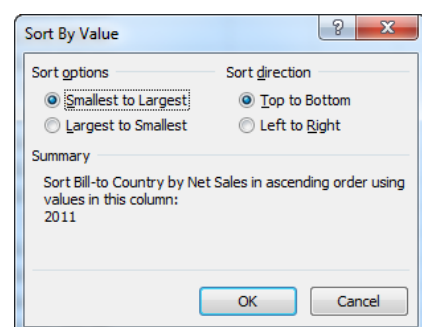
6.2 Sorting data

Sorting can be performed with standard Excel functionality. In pivot tables we can sort by dimensions and measures. Sorting in ascending or descending order is always possible. The more advanced options are context based and depend on whether we want to sort dimensions or measures. By right-clicking a field and selecting *Sort >> More Sort options* we will be presented with the relevant possibilities.

Dimension Sort options:



Measures Sort Options:



6.3 Filtering data


Filtering allows us to limit the data presented to us based on certain conditions. Like with sorting, we can filter on dimensions and measures and for that we have two types of filters plus a special Top filter option:

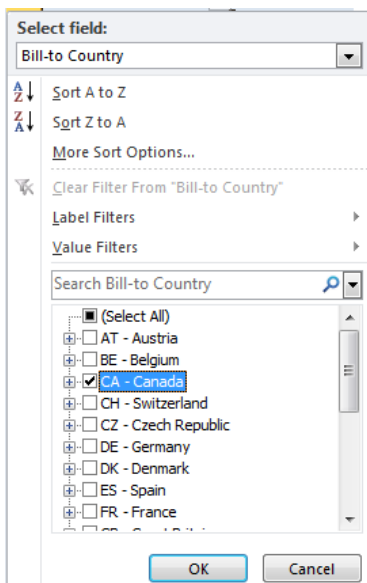
- Label filters
- Value filters
- Top filter

Any pivot table can also contain a report filter, which is a dimension filter applied to the entire report.

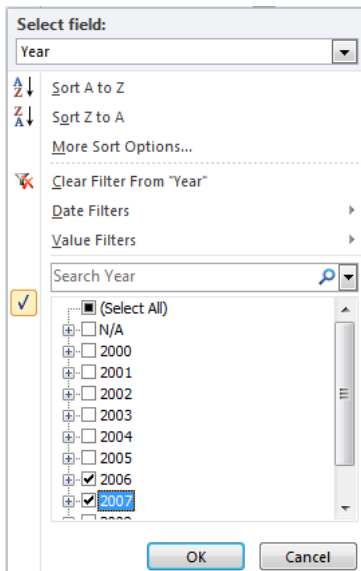
6.3.1 Label filters

Label filters are based on dimension values.

In our example we wish to display only gross sales in Canada, therefore it is necessary to setup a filter on *Customer by Country* dimension. This is done by clicking on icon  and choosing a filter value. We can also filter by multiple values. For more options on setting Label filters you can also select *Filter >> Label Filters...*



We can have filters set on rows and columns at the same time for any dimension present. We will set up the filter for our date dimension on years 2006 and 2007.

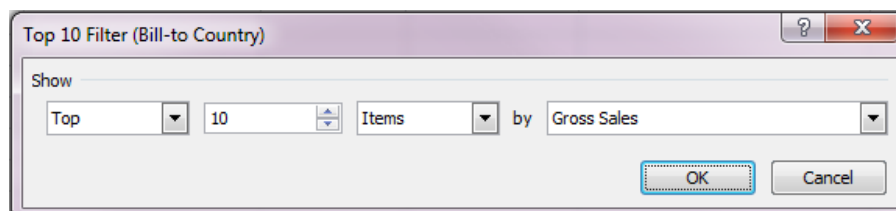


If we wish to remove filter, we right click on a dimension value and select *Filter >> Clear Filter From ...* in drop down menu.

6.3.2 Top 10 filters

We can filter our data to display top X customers, vendors ... To set a Top filter we right click on one of the countries in our rows and select *Filter >> Top 10...* from the drop down menu.

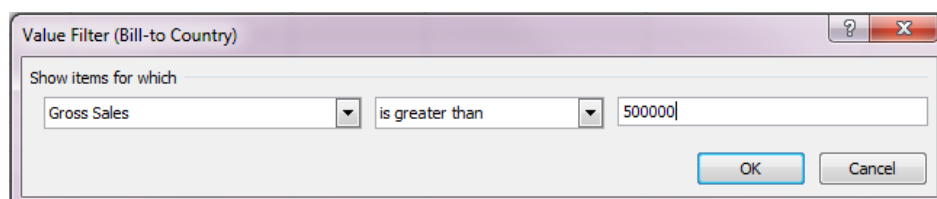
In the Top 10 Filter window we control whether we want to select top or bottom members, the number of members, whether we want to count them as individual items or percentages and by which measure we want our filter to display. Please note that you can choose any measure in the OLAP cube, even if it not present in the pivot table.



6.3.3 Value filters


Value filters are based on the measure values and are set up by right clicking and choosing *Filter >> Value Filters...* from the drop down menu.

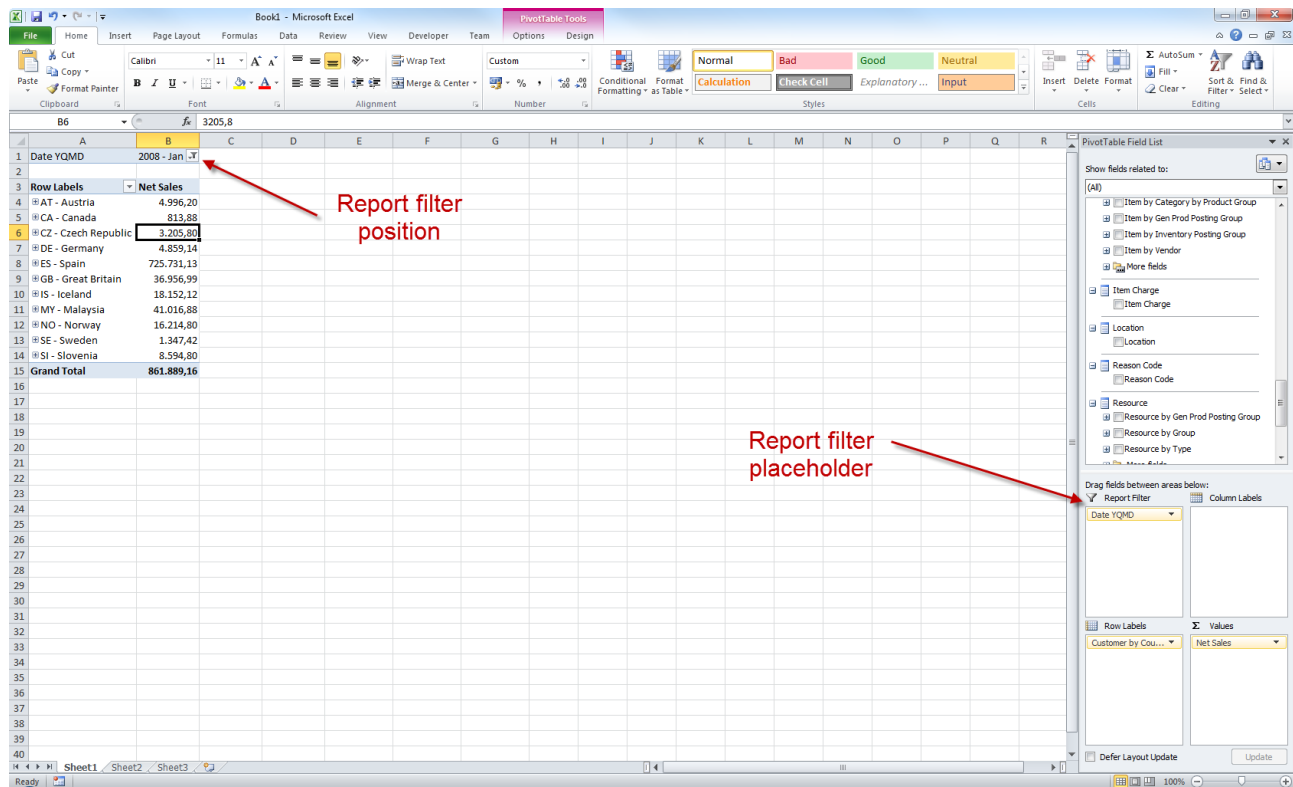
In the Value Filter window we select the measure on which we want to base our filter on, and the condition for the filter.



6.3.4 Report filters

Report filter is a separate placeholder in the pivot table layout. Only dimensions can be a part of the report filter. By setting report filter you are filtering all the other measures and dimensions in the pivot table (in rows, columns and measures).

Report filters appear above the pivot table and you can set a value by clicking on the  icon next to the name.



The screenshot shows an Excel PivotTable with the following data:

Date YQMD	Net Sales
2008 - Jan - IT	3205,8
AT - Austria	4.996,20
CA - Canada	813,88
CZ - Czech Republic	3.205,80
DE - Germany	4.859,14
ES - Spain	725.731,13
GB - Great Britain	36.956,99
IS - Iceland	18.152,12
MY - Malaysia	41.016,88
NO - Norway	16.214,80
SE - Sweden	1.347,42
SI - Slovenia	8.594,80
Grand Total	861.889,16

The PivotTable Field List task pane on the right shows the following configuration:

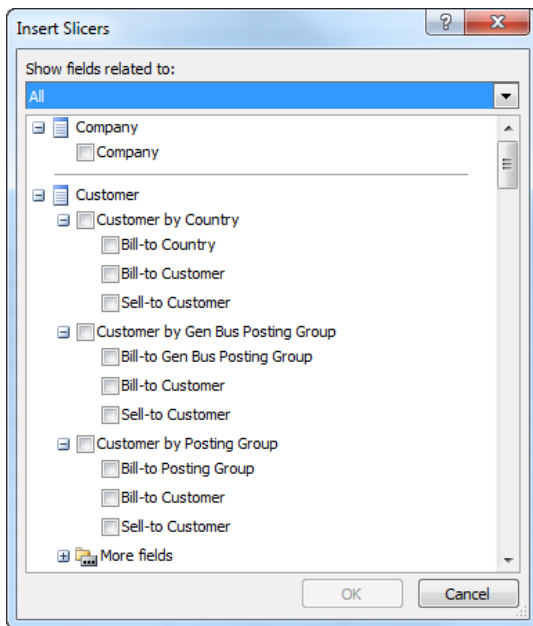
- Report Filter:** Date YQMD
- Row Labels:** Customer by Cou...
- Values:** Net Sales

6.4 Slicers

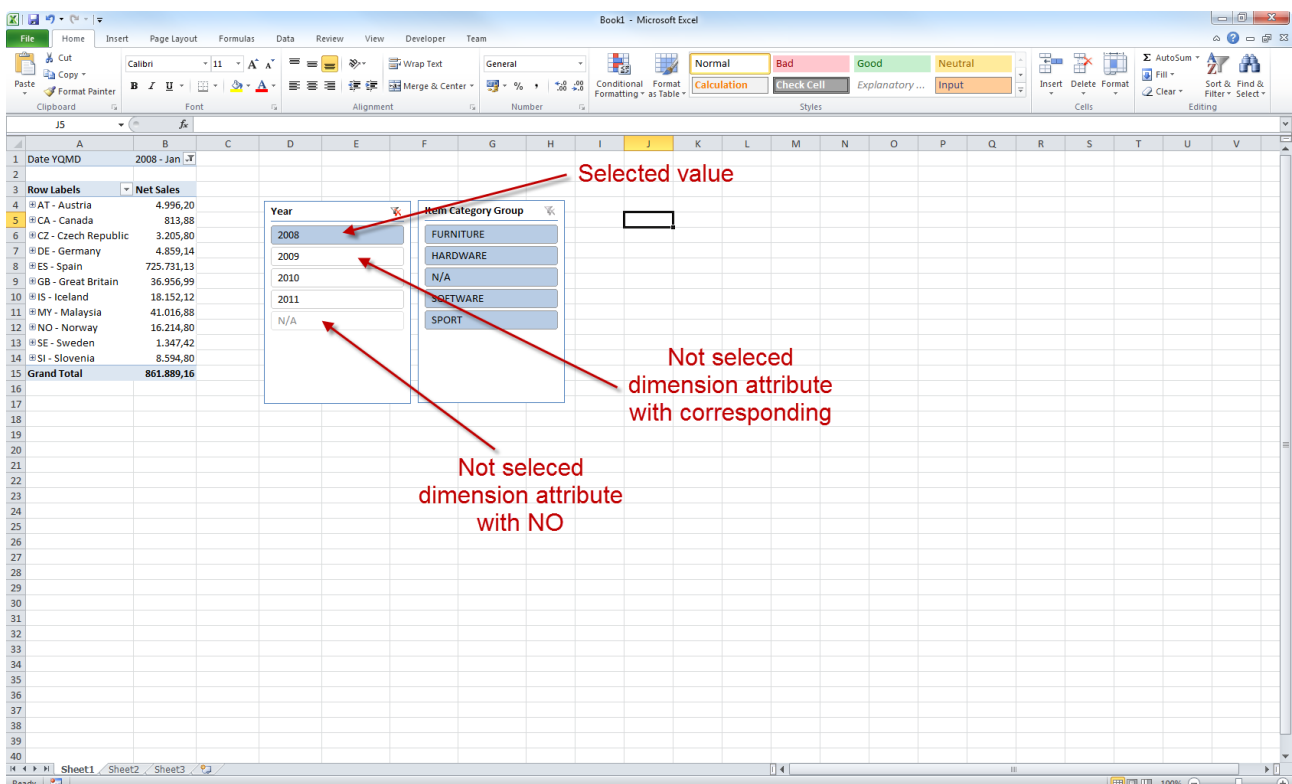
A special kind of report filters introduced in Excel 2010 are Slicers. Slicers offer several advantages over standard report filters:

- They are a much more visual way to present your filters and you can quickly see what you have filtered on and even indicate where there is no data.
- They can be tied to more than one pivot table (if they use the same connection)
- They can be formatted, customized and rearranged.

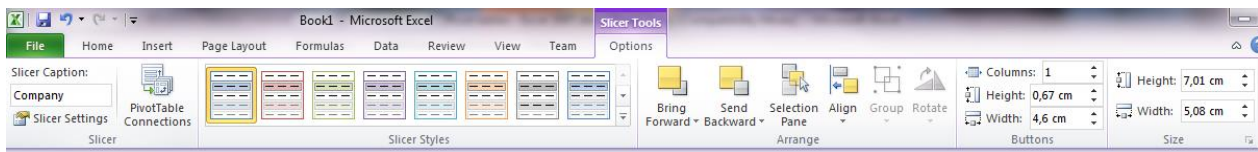
To create a Slicer you can select the pivot table and click *Options >> Insert Slicer*. This brings up a window where you can select individual hierarchy levels of dimensions to create desired slicers. Each level will create a separate slicer.



Slicers
Start from pivot table




There is a new Slicer Tools tab available when you select a slicer. This gives you several options to customize the appearance and behavior of your Slicer.

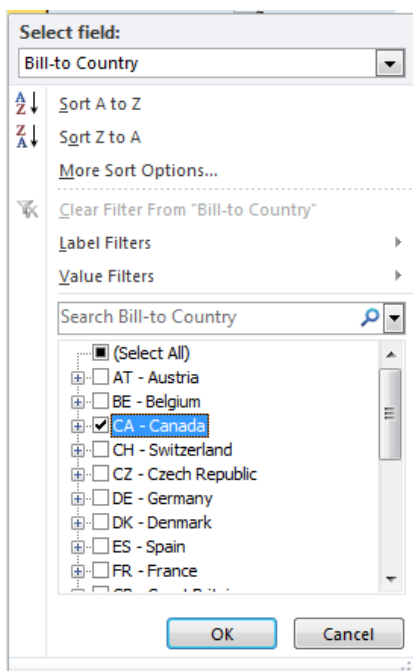


1. *Slicer Caption* – name of the slicer.
2. *Pivot Table Connections* – connection between slicer and pivot table.
3. *Slicer Styles* – slicer style.
4. *Bring Forward* – position of the slicer.
5. *Send Backward* – position of the slicer.
6. *Selection Pane* – turns on the ribbon with all slicers.
7. *Align* – position of the slicers.
8. *Group* – slicers grouping.
9. *Rotate* – rotates the slicer.
10. *Buttons* – defining option buttons in the slicer.
11. *Size* – defining slicer width and height.

6.5 Search

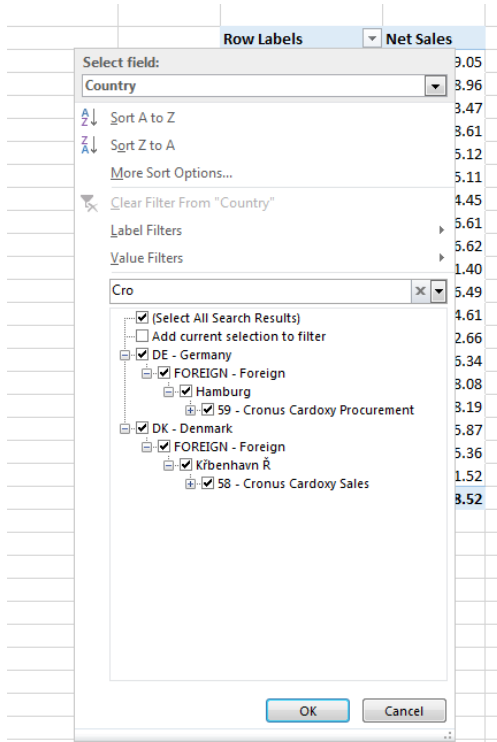
Another powerful new feature of Excel 2010 is the Search.

By clicking on the icon  you will see the Search box in the dropdown menu. Based on the selected field of the dimension hierarchy you can search for members by typing in the box. The results are filtered on-the-fly as you start typing. This is very useful when you want to find a specific member in a large dimension (for example a specific customer from the customer dimension, or all documents that start with 011...).



You can select more options by clicking on button on the right area of search window so that you can search by different hierarchy levels:

- Country
- Territory
- City
- Customer



Search by different hierarchies

6.6 Subtotals, dimension levels display and grouping

6.6.1 Subtotals

By default, your pivot table will show Subtotals for various dimension hierarchy levels when you drill down. We can turn it off by removing the thick in front of Subtotal option in the right-click drop down menu.

Row Labels	Net Sales
2008	6.129.774,31
2008 - Q1	1.768.225,94
2008 - Jan	861.889,16
02.01.2008	725.727,82
04.01.2008	4.865,26
07.01.2008	6.615,23
10.01.2008	8.831,92
12.01.2008	6.166,78
13.01.2008	15.290,40
15.01.2008	23.592,62
16.01.2008	8.021,20
18.01.2008	2.120,60
19.01.2008	53.365,94
22.01.2008	7.288,08
28.01.2008	3,31
2008 - Feb	406.149,16
2008 - Mar	500.187,62
2008 - Q2	1.260.683,75
2008 - Q3	1.902.514,41
2008 - Q4	1.198.350,21
2009	6.973.239,71
2010	8.012.044,92
2011	11.384.463,99
Grand Total	32.499.522,93

6.6.2 Dimension levels display

Row Labels	Net Sales
2008	6.129.774,31
2008 - Jan	861.889,16
2008 - Feb	406.149,16
2008 - Mar	500.187,62
2008 - Apr	230.761,98
2008 - May	637.016,62
2008 - Jun	392.905,15
2008 - Jul	964.631,98
2008 - Aug	399.773,59
2008 - Sep	538.108,84
2008 - Oct	437.950,54
2008 - Nov	397.228,61
2008 - Dec	363.171,06
2009	6.973.239,71
2010	8.012.044,92
2011	11.384.463,99
Grand Total	32.499.522,93

When browsing dimensions, many times pivot tables become too big. In the example above we browsed to the deepest level of *Date YQMD* dimension.

We can hide individual level from the hierarchy by right clicking on the field and select *Show/Hide Fields*. This can help us in keeping our pivot tables easier to read and understand. In the below example we hid the quarter and day level of the Date YQMD dimension.

6.6.3 Grouping dimension data

In pivot tables we can group data into custom groups. In our example we will group years 2010 and 2011.

We select the cells for 2010 and 2011 and right click to open the drop down menu. There we select *Group...* option. This can be also done by clicking pivot table tab *Options >> Group >> Group Selection*.

Row Labels	Net Sales
Last 2 years	19.396.508,91
2010	8.012.044,92
2011	11.384.463,99
Other	13.103.014,02
2008	6.129.774,31
2009	6.973.239,71
Grand Total	32.499.522,93

Grouping: ad hoc, local, My top customers

We can rename the groups by clicking on their name and typing.

If we wish to ungroup, we select a group, right click to open drop down menu and select *Ungroup...* option. We can also do it by clicking *Options >> Group >> Ungroup*.

6.7 Exercises

6.7.1 Exercise 1 – Filters, Search and Sort

Step 1: Create a new report with Bill-to-Customer in rows, Item by Category in report filters and Net Sales and Profit % as measures.

Step 2: Set the report filter to Disk Product Group by Searching for "DISK" (remember to set the Product Group Level!)

Step 3: Set a TOP 10 display filter by Net Sales

Step 4: Sort the pivot table descending by Profit%

Item by Category by Product Group	DISK	
Row Labels	Net Sales	Profit %
68 - Möbel Siegfried	10.032,80	75,05%
72 - London Candoxy Storage Campus	8.083,10	74,58%
52 - Blanemark Hifi Shops	8.257,40	67,76%
60 - Hotel Pferdesee	8.198,20	66,31%
22 - John Haddock Insurance Co.	8.982,07	63,24%
36 - Gagn & Gaman	14.669,30	62,47%
34 - Helguera industrial	8.165,18	55,65%
56 - The Device Shop	8.741,40	54,72%
49 - Beef House	10.338,10	41,57%
64 - Klubben	13.088,00	24,53%
Grand Total	98.555,55	57,10%

6.7.2 Exercise 2 – Slicers

Use the report created in the previous exercise.

Step 2: Click on the pivot table and click Insert Slicer

Step 3: Select Date YMD Year and under More Fields Month for the Slicers and click OK.

Step 4: Resize the Month slicer and increase the number of columns to fit all the members.

Step 5: Filter on Year 2010 and Month of June

Item by Category by Product Group DISK		
Row Labels	Net Sales	Profit %
37 - MEMA Ljubljana d.o.o.	580,00	60,30%
68 - Möbel Siegfried	498,40	55,88%
65 - Englunds Kontorsmöbler AB	610,50	50,09%
56 - The Device Shop	559,40	46,37%
67 - Afrifield Corporation	253,40	45,99%
59 - Cronus Cardoxy Procurement	628,20	45,72%
22 - John Haddock Insurance Co.	189,00	45,58%
10 - Progressive Home Furnishings	589,00	45,50%
36 - Gagn & Gaman	488,60	45,49%
16 - Somadis	634,70	37,11%
Grand Total	5.031,20	47,88%

Year

2008

2009

2010

2011

N/A

Month

January

February

March

April

May

June

July

August

September

October

November

December

N/A

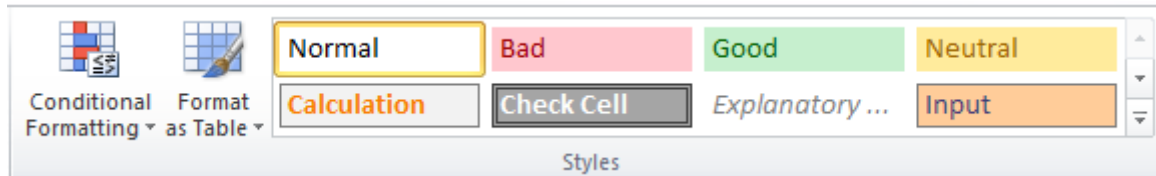
7 FORMATTING

7.1 Pivot table formatting

For pivot table formatting we can use all common Excel formatting functions. We can change font size, colors, cell size, cell color...

Style does not change when we nest dimensions, add new dimensions and refresh data...

We can find all formatting options in *Styles* toolbar. We can find it in *Microsoft Excel* >> *Home* tab. There is also separate PivotTable Styles section on the Design tab of the pivot table Tools group.



7.2 Displaying and formatting measures

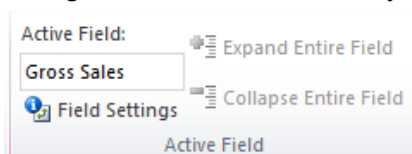
We manage measures in the same way as dimensions. Usually we wish to show measures in a specific format (numbers, percentage ...) and style (red for negative or based on certain condition).

In our example we remove the *Sales-purchaser Person* dimension and we add the *Sales Discount Amount* measure. By doing this we are able to see by years what the discount amount was.

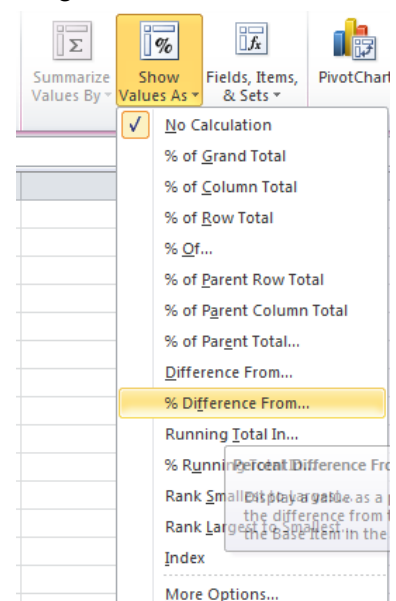
7.2.1 Show values as...

By default measures are shown in the format defined in the OLAP cubes. But, for example, we are sometimes interested in percentage values rather than the actual values. In this way we can monitor changing measures throughout a period of time in a more descriptive way. In our example we will show *Gross sales* in percentage.

We select the cells we want to format and right click. In the drop down menu we select *Value Field Settings*. We can do this also by *Options* >> *Active Field* >> *Field Settings*.



Other way of showing value in percentage, you need to select appropriate measure and click on icon *Show Value As* in the ribbon.

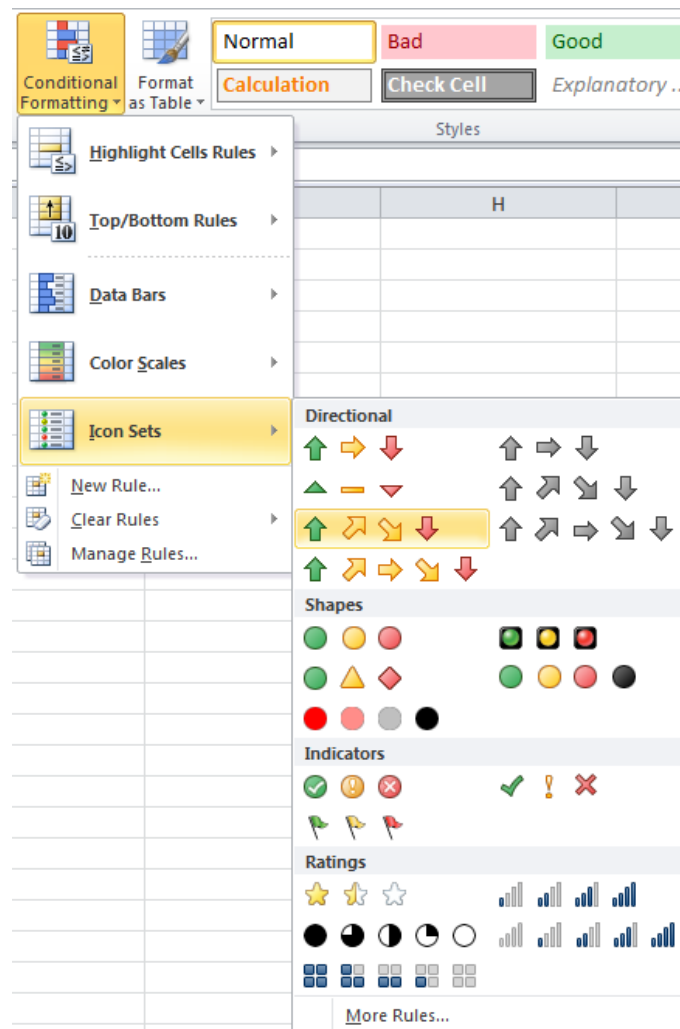


7.3 Conditional formatting

Conditional formatting enables us to visually indicate outliers based on the conditions we define. Including traffic lights into a pivot table is presented in this chapter. Traffic lights help managers to observe business indicators and take measures if necessary. There are however other types available as well:

- *Highlight Cells Rules* – highlight: greater than, lower than, equal to, between...
- *Top/Bottom Rules* – Displaying top 10, bottom 10, top 10 %, bottom 10 %, above average, below average...
- *Data Bars* – graphically displaying cell values.
- *Color Scales* – displaying cell color according to its value
- *Icon Sets* – displaying cell icons according to its value (arrows, traffic lights...).

First we have to select the cells we want to add traffic lights to. Then we go to *Microsoft Excel* >> *Home* >> *Conditional Formatting* >> *Icon Sets*.



Selected traffic lights are automatically assigned to rows. By default Excel selects a light according to the averages. If we wish to have our own rules we click *More Rules...*

In *Apply Rule To* – we select the location of the traffic light cells. In *Select a Rule Type* we select a rule type. In our case the rule is determined by cell values. In *Edit the Rule Description* we set up rules for each light. We click OK.

Edit Formatting Rule

Apply Rule To:

☒ Selected cells
☐ All cells showing "Gross Sales" values
☐ All cells showing "Gross Sales" values for "Bill-to Country"

Select a Rule Type:

- ▶ Format all cells based on their values
- ▶ Format only cells that contain
- ▶ Format only top or bottom ranked values
- ▶ Format only values that are above or below average
- ▶ Use a formula to determine which cells to format

Edit the Rule Description:

Format all cells based on their values:

Format Style:

Icon Style: ☐ Show Icon Only

Display each icon according to these rules:

Icon	Condition	Value	Type
	when value is	>= 67	Percent
	when < 67 and	>= 33	Percent
	when < 33		

OK Cancel

7.4 Exercises

7.4.1 Exercise 1 - Formatting

Create report Sales by country in Dec 2009 over multiple measures.

Step 1: Connect to server to establish connection to Sales cube.

Step 2: Select Customer by country (Row label).

Step 3: Drag Net Sales, Net Sales YTD and Net Sales YTD index in column label

Date.Date YMD

2015 - Jun

</

Step 4: Which country has the biggest YTD index?

Step 5: Format numbers to remove decimals.

Step 6: Drag Net Sales (again) in column label and sort by Net Sales YTD.

Step 7: Show Net Sales **as percentage of column.**

Step 8: Use conditional formatting

Date.Date YMD	2015 - Jun				
	Net Sales	Net Sales2	Net Sales YTD	Net Sales YTD Index	
GB - Great Britain	83,394.40	11.03%	752,195.21	127.97%	
DE - Germany	16,494.16	2.18%	476,604.01	143.48%	
ES - Spain	93,944.42	12.42%	402,003.17	150.30%	
US - USA		0.00%	398,714.80	143.95%	
CA - Canada	71,474.21	9.45%	394,732.14	165.48%	
CH - Switzerland	32,128.82	4.25%	365,090.23	123.52%	
AT - Austria	74,639.81	9.87%	327,944.59	186.46%	
SE - Sweden	102,977.51	13.62%	316,984.58	100.84%	
IS - Iceland	123,275.87	16.30%	232,493.35	77.81%	
BE - Belgium	14,983.40	1.98%	202,453.53	112.05%	
FR - France	4,805.85	0.64%	193,893.55	284.23%	
MO - Morocco	9,707.70	1.28%	188,428.11	113.59%	
SI - Slovenia	5,385.70	0.71%	179,392.11	143.88%	
MY - Malaysia	31,122.80	4.12%	162,245.43	144.25%	
NO - Norway	19,326.99	2.56%	160,830.77	185.68%	
NL - Holland	26,149.76	3.46%	158,977.24	85.86%	
DK - Denmark	23,519.63	3.11%	142,096.92	84.55%	
CZ - Czech Republic	19,588.64	2.59%	117,722.34	91.00%	
ZA - South Africa	3,176.75	0.42%	63,666.62	215.67%	
Grand Total	756,096.42	100.00%	5,236,468.70	129.67%	

Month

2012 - Jan

2012 - Feb

2012 - Mar

2012 - Apr

2012 - May

2012 - Jun

2012 - Jul

2012 - Aug

2012 - Sep

2012 - Oct

2012 - Nov

2012 - Dec

2013 - Jan

2013 - Feb

2013 - Mar

2013 - Apr

2013 - May

2013 - Jun

2013 - Jul

2013 - Aug

2013 - Sep

2013 - Oct

2013 - Nov

2013 - Dec

2014 - Jan

2014 - Feb

2014 - Mar

2014 - Apr

2014 - May

2014 - Jun

2014 - Jul

2014 - Aug

2014 - Sep

2014 - Oct

2014 - Nov

2014 - Dec

2015 - Jan

2015 - Feb

2015 - Mar

2015 - Apr

2015 - May

2015 - Jun

2015 - Jul

2015 - Aug

2015 - Sep

2015 - Oct

2015 - Nov

2015 - Dec

N/A

2016 - Jan

2016 - Feb

7.4.2 Exercise 2

Bill to sell to ship to over net sales

Step 1: Copy existing report you created in exercise 1 on same sheet.

Step 2: Remove all measures except net sales.

Step 3: Filter year 2006 in the background.

Step 4: Filter country GB in the background.

Step 5: Add bill to, sell to, and ship to dimension in row label.

Step 4: Add additional measures shipped quantity, shipped/invoiced variance in column labels.

Step 5: Format measures (no decimals)

End result

Date YQMD	2006				
Customer by Country	GB - Great Britain				
			Values		
Bill-to Customer	Sell-to Customer	Ship-to Name	Net Sales	Shipped Quantity	Shipped/Invoiced Variance
60000 - Blanemark Hifi Shops	60002 - Blanemark Hifi Center SW	Blanemark Hifi Center SW	2.125	1	-33
Grand Total			2.125	1	-33

7.4.3 Exercise 3

Sales/purchaser over multiple measures over customer by county and year 2009 Dec.

Step 1: Create new report on the same sheet.

Step 2: Select Sales/Purchaser dimension and drag it to row label.

Step 3: Drag Net sales, profit, Net sales last YTD... to column label.

Step 4: Put Date dimension in the report filter and set filter 2009 – Dec.

Step 5: Put Customer by country dimension in report filter and set it for Switzerland.

Step 6: Format numbers.

HINT: You have to format the description of measures to get the same result as in picture.

Date YQMD	2009 - Dec				
Customer by Country	CH - Switzerland				
Values					
Row Labels	Net Sales	Profit	Net Sales Last YTD	Net Sales YTD	Net Sales YTD Index
JR - John Roberts	56.401	51.260	133.311	276.612	207%
MD - Mary A. Dempsey	43.553	30.647	138.929	191.945	138%
BD - Bart Duncan	2.269	1.391	121.679	134.616	111%
RL - Richard Lum	1.749	998	238.013	225.895	95%
Grand Total	103.971	84.296	631.931	829.069	131%

7.4.4 Exercise 4 Conditional formatting in action:

	Net Sales	Net Sales YTD	Net Sales YTD Index		Profit	Profit YTD	Profit YTD Index	Profit %
2014	1,765,203.66	1,765,203.66	143.89%		753,628.36	753,628.36	116.74%	42.69%
2014 - Jan	128,774.91	128,774.91	2378.74%		31,337.94	31,337.94	4862.14%	24.34%
2014 - Feb	112,645.37	241,420.28	136.21%		60,152.69	91,490.63	73.48%	53.40%
2014 - Mar	144,178.39	385,598.67	204.96%		55,689.75	147,180.38	111.22%	38.63%
2014 - Apr	155,355.17	540,953.84	259.89%		42,207.15	189,387.53	133.32%	27.17%
2014 - May	87,516.27	628,470.11	185.54%		33,601.72	222,989.25	94.37%	38.39%
2014 - Jun	175,157.04	803,627.15	201.86%		52,439.23	275,428.48	105.95%	29.94%
2014 - Jul	163,360.31	966,987.46	123.29%		52,749.61	328,178.09	72.20%	32.29%
2014 - Aug	137,757.47	1,104,744.93	119.56%		41,908.35	370,086.44	69.80%	30.42%
2014 - Sep	190,000.09	1,294,745.02	133.76%		121,171.69	491,258.13	90.07%	63.77%
2014 - Oct	240,662.37	1,535,407.39	144.43%		147,735.45	638,993.58	109.05%	61.39%
2014 - Nov	89,538.86	1,624,946.25	140.45%		44,793.11	683,786.69	109.72%	50.03%
2014 - Dec	140,257.41	1,765,203.66	143.89%		69,841.67	753,628.36	116.74%	49.80%
2015	1,169,638.83	2,448,898.21	138.73%		721,460.03	1,526,973.91	202.62%	61.68%
2015 - Jan	369,163.89	369,163.89	286.67%		216,129.02	216,129.02	689.67%	58.55%
2015 - Feb	97,803.57	466,967.46	193.43%		45,250.12	261,379.14	285.69%	46.27%
2015 - Mar	210,637.27	677,604.73	175.73%		127,540.20	388,919.34	264.25%	60.55%
2015 - Apr	230,118.94	907,723.67	167.80%		153,609.80	542,529.14	286.47%	66.75%
2015 - May	138,652.37	1,046,376.04	166.50%		101,135.17	643,664.31	288.65%	72.94%
2015 - Jun	123,262.79	1,169,638.83	145.54%		77,795.72	721,460.03	261.94%	63.11%
Grand Total	2,934,842.49				1,475,088.39			50.26%

Country

AT - Austria

BE - Belgium

CA - Canada

CH - Switzerl...

CZ - Czech Re...

DE - Germany

DK - Denmark

ES - Spain

FR - France

GB - Great Bri...

IS - Iceland

MO - Morocco

MY - Malaysia

NL - Holland

NO - Norway

SE - Sweden

SI - Slovenia

US - USA

ZA - South Afr...

N/A

Month

2012 - Jan

2012 - Feb

2012 - Mar

2012 - Apr

2012 - May

2012 - Jun

2012 - Jul

2012 - Aug

2012 - Sep

2012 - Oct

2012 - Nov

2012 - Dec

2013 - Jan

2013 - Feb

2013 - Mar

2013 - Apr

2013 - May

2013 - Jun

2013 - Jul

2013 - Aug

2013 - Sep

2013 - Oct

2013 - Nov

2013 - Dec

2014 - Jan

2014 - Feb

2014 - Mar

2014 - Apr

2014 - May

2014 - Jun

2014 - Jul

2014 - Aug

2014 - Sep

2014 - Oct

2014 - Nov

2014 - Dec

2015 - Jan

2015 - Feb

2015 - Mar

2015 - Apr

2015 - May

2015 - Jun

2015 - Jul

2015 - Aug

2015 - Sep

2015 - Oct

2015 - Nov

2015 - Dec

N/A

2016 - Jan

2016 - Feb

2016 - Mar

2016 - Apr

2016 - May

2016 - Jun

2016 - Jul

2016 - Aug

7.4.5 Exercise 5

Trend analysis: Net sales over quarters and years for GB by posting group.

Step 1: Create new report on the same sheet.

Step 2: Drag in Date dimension YMD in row label.

Step 3: Drag in Quarter (separate date dimension under additional fields) in column label.

Step 4: Set up Customer by country in background filter and set it for Great Britain.

Step 5: Show net sales as percentage of row (HINT: Select all measures > right click > value field settings).

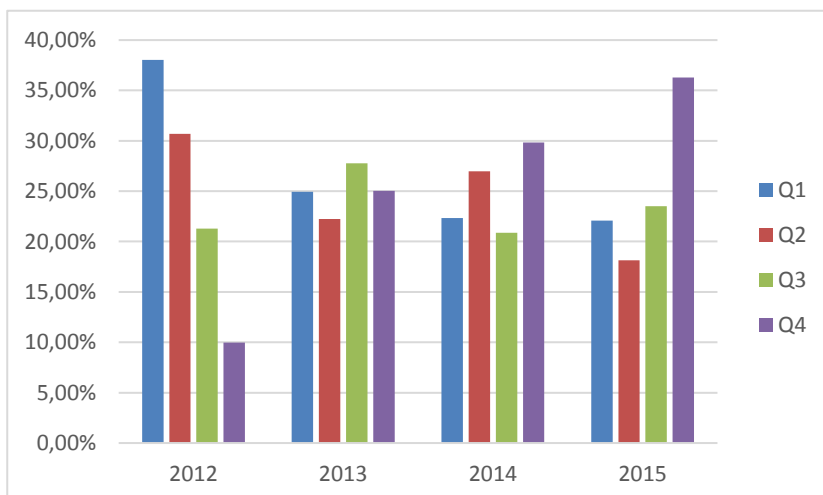
Step 6: Format cells to get the similar result as in the picture.

Bill To						
Customer.Customer By		GB - Great				
Country Territory City		Britain				
Net Sales		Column Labels				
Row Labels		Q1	Q2	Q3	Q4	Grand Total
+ 2012		38.04%	30.70%	21.29%	9.96%	100.00%
+ 2013		24.95%	22.23%	27.78%	25.04%	100.00%
+ 2014		22.32%	26.98%	20.86%	29.83%	100.00%
+ 2015		22.09%	18.13%	23.50%	36.28%	100.00%
Grand Total		27.43%	24.35%	23.51%	24.71%	100.00%

Step 7: Apply conditional formatting:

Bill To						
Customer.Customer By		GB - Great				
Country Territory City		Britain				
Net Sales		Column Labels				
Row Labels		Q1	Q2	Q3	Q4	Grand Total
+ 2012		38.04%	30.70%	21.29%	9.96%	100.00%
+ 2013		24.95%	22.23%	7.78%	25.04%	100.00%
+ 2014		22.32%	26.98%	20.86%	29.83%	100.00%
+ 2015		22.09%	18.13%	23.50%	36.28%	100.00%
Grand Total		27.43%	24.35%	23.51%	24.71%	100.00%

Step 8: Create chart



8 CHARTS

8.1 Pivot charts vs. Normal charts

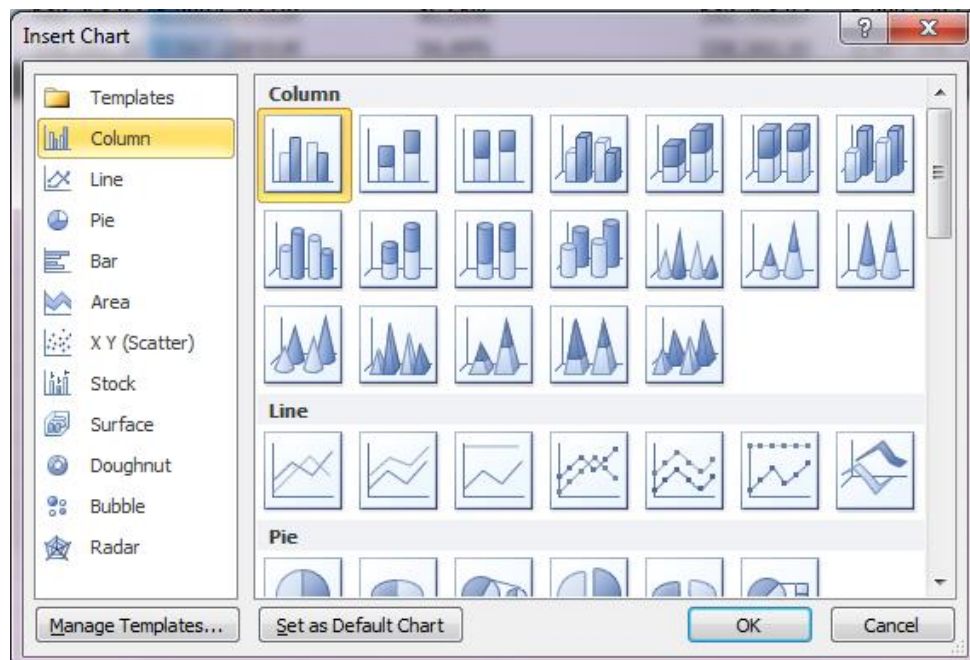
Pivot charts are linked with the pivot table. Whatever changes you make in the pivot table are immediately reflected on the chart and vice versa. Everything in the pivot table is also present on the chart.

Normal charts on the other hand have to be manually defined and therefore any changes to the pivot table don't automatically reflect in the chart. Although this can be seen as a downside, it also gives you a lot more options in customizing your chart independently of the pivot table.

8.1.1 Pivot table and pivot chart commands comparison

Pivot table	Description	Pivot chart	Description
Values	Sum of numeric data	Values	Sum of numeric data
Row labels	Displaying fields on a margin of the report	Axis fields (Categories)	Displaying fields on chart axis
Column labels	Displaying fields in the top of the report	Legend fields (Series) labels	Displaying fields in chart legend
Report filter	It is used for filtering reports by selected criteria	Report filter	It is used for filtering reports by selected criteria

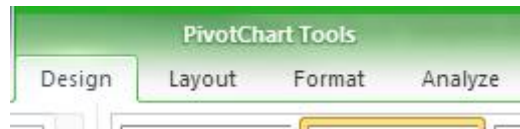
Pivot charts are dynamical structures because pivot tables have that characteristic. Inserting a pivot chart is very easy. We go to *Options >> Tools >> Pivot Chart* and *Insert Chart* window is displayed.



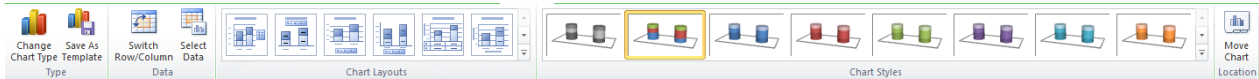
3D charts – never use
Pie chart – minimize use

8.2 Chart design

When we click on the chart *Pivot Chart Tools* tab is displayed.

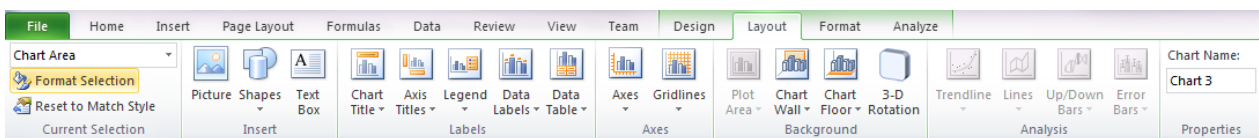


Here we have several tools for chart design.



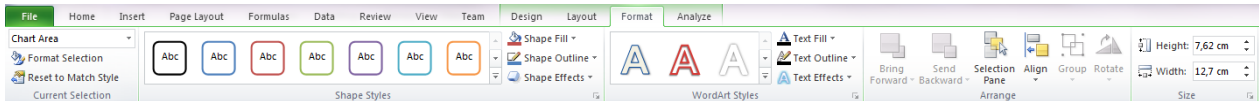
1. *Change Chart Type* – change chart template.
2. *Save as Template* – Save chart as template.
3. *Switch Row/Column* – move values from rows to columns.
4. *Select Data* – selecting chart data.
5. *Chart Layouts* – changing chart layout, legend, background,
6. *Chart Styles* – selecting chart style.
7. *Move Chart* – Moving chart to another sheet.

8.3 Chart layout



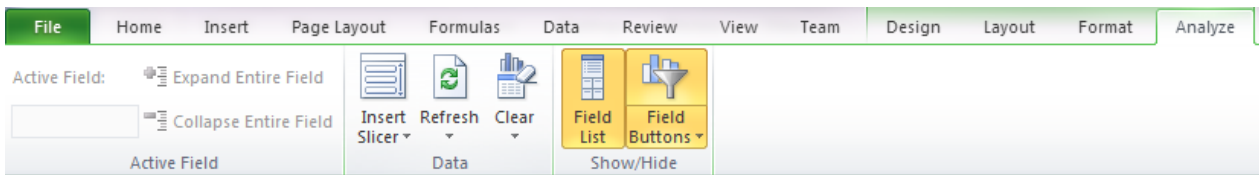
1. *Chart Area* – Displays current chart selection
2. *Format Selection* – formatting selection (color, fill, font style ...).
3. *Reset to Match Style* – default style.
4. *Picture* – Adding picture.
5. *Shapes* – Adding shapes.
6. *Text Box* – Adding text boxes.
7. *Chart Title* – Changing char title.
8. *Axis Titles* – Axis (x,y) names.
9. *Legend* – Editing legend.
10. *Data Labels* – Editing data, values displayed in the chart
11. *Data Table* – Editing, adding table t the chart
12. *Axes* - Editing x,y axes.
13. *Gridlines* – Editing gridlines.
14. *Plot Area* – Editing plot.
15. *Chart Wall* – Editing chart wall.
16. *Chart Floor* – Editing chart floor.
17. *3-D Rotation* – Rotating chart.
18. *Trendline* – Editing trendline.
19. *Lines* – Editing lines.
20. *Up/Down Bars* – Moving, adding XXXXX.
21. *Error Bars* – Display errors.
22. *Chart Name:* - chart name.

8.4 Chart format



1. Same as 1., 2. and 3. in previous tab.
2. Editing chart border.
3. Editing chart font.
4. Chart position.
5. Chart size.

8.5 Analyze chart options



1. Editing chart analysis area.
2. *Insert Slicer* – adding additional slicers.
3. *Refresh* – refreshing data.
4. *Clear* – clear filters.
5. *Field List* – turn on of field list.
6. *Pivot Chart Filter* – window for setting chart filters.

Data is refreshed by clicking *Refresh* icon in *Analyze* tab or by right clicking on a cell and selecting *Refresh* option in drop down menu.

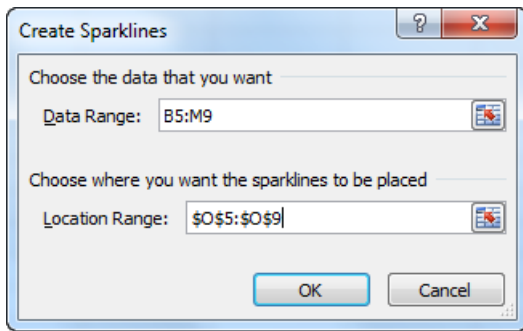
8.6 Sparklines

Sparklines are a special in-cell chart type introduced in Excel 2010. They are great for showing trends over time. Because they are in-cell charts, they take very little space and are used to provide a general overview.

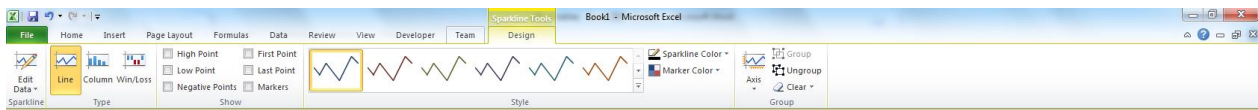
To insert a sparkline, select the data you want to chart and click on the type of sparkline you want to create on the Insert tab in the ribbon. The types available are:

- Line
- Column
- Win/Loss

You also have to specify the location range, that is, the cells where the sparklines will appear. Note that you have to select a cell for each series of the sparkline. Multiple series will be grouped together by default, meaning they share the same characteristics. You can ungroup or group individual sparklines together as you wish later on.



After you create the sparkline another tab with the options to customize your sparkline will be created in the ribbon.



- Edit data – allows you to change the data range used to plot the sparklines
- Type – change the type of the sparkline
- Show – high and low points, first and last points, negative points or markers for individual data points
- Style - change the style of the sparklines
- Sparkline color – change the color and thickness of the sparklines
- Marker color – change the color of individual marker points
- Axes – customize axis settings
- Group & Ungroup – allows you to group or ungroup individual sparklines

8.7 Exercises

8.7.1 Exercise 1 – Charting

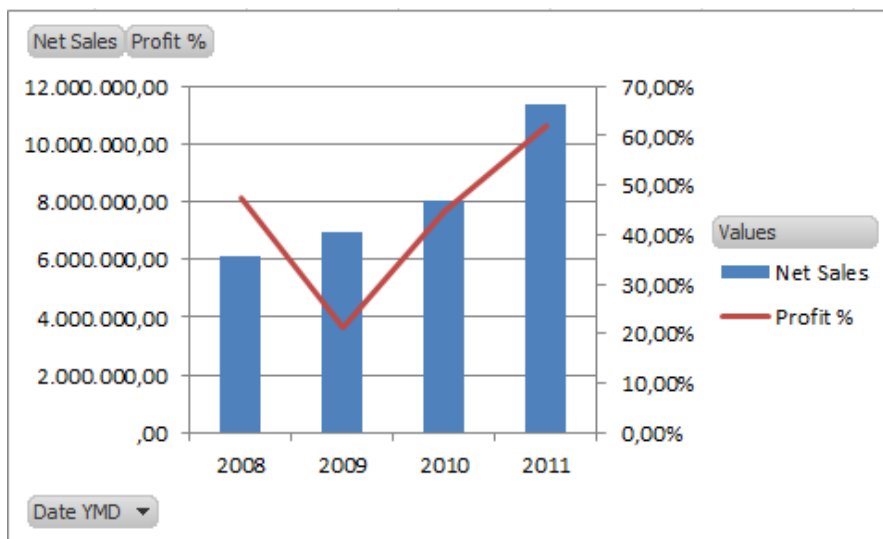
Step 1: Create a report showing Net Sales and Profit % over Years

Step 2: Select the entire data range and Insert a column chart

Step 3: On the layout tab select the "Series Profit%" from the dropdown menu in current selection and then click format selection

Step 4: In the new window that open select to plot the series on the secondary axis. Note the change in you chart.

Step 5: While still having the series selected, right click on it in the chart and select to change the chart type to line chart.



8.7.2 Exercise 2 - Sparklines






Step 1: Create a report showing Net Sales of your product categories over individual months

Step 2: Select the entire data range and click on Insert Slicer

Step 3: Select the cells to the right of the pivot table as the location range for the slicers and click OK

Step 4: Make sure all the sparklines use the same minimum and maximum for vertical axis

Step 5: Highlight the Last point with a red bullet

Net Sales	Column Labels													
Row Labels	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total	
FURNITURE	745.638,41	801.921,12	589.746,93	704.544,08	989.479,37	955.342,60	1.313.459,98	747.519,93	848.111,60	876.302,02	879.510,25	831.998,59	10.283.574,88	
HARDWARE	127.336,68	129.166,40	131.559,41	165.737,11	138.275,85	172.618,17	207.658,49	322.826,87	172.318,47	183.978,70	293.487,20	920.310,22	2.965.273,57	
N/A	168.335,36	139.164,00	131.892,50	168.476,00	223.020,89	188.342,50	213.064,00	177.838,50	185.838,00	183.565,00	202.003,00	218.741,00	2.200.280,75	
SOFTWARE	519.737,69	604.339,42	556.280,80	734.374,17	644.401,34	659.861,61	757.407,07	654.238,37	552.582,46	761.335,09	593.935,53	1.306.049,50	8.344.543,05	
SPORT	1.386.980,26	673.966,63	1.101.771,43	1.192.491,72	526.833,85	277.837,76	1.008.236,17	571.019,23	610.079,30	484.037,03	395.517,48	477.079,82	8.705.850,68	
Grand Total	2.948.028,40	2.348.557,57	2.511.251,07	2.965.623,08	2.522.011,30	2.254.002,64	3.499.825,71	2.473.442,90	2.368.929,83	2.489.217,84	2.364.453,46	3.754.179,13	32.499.522,93	

9 ADDITIONAL EXERCISES

9.1 Sales cube

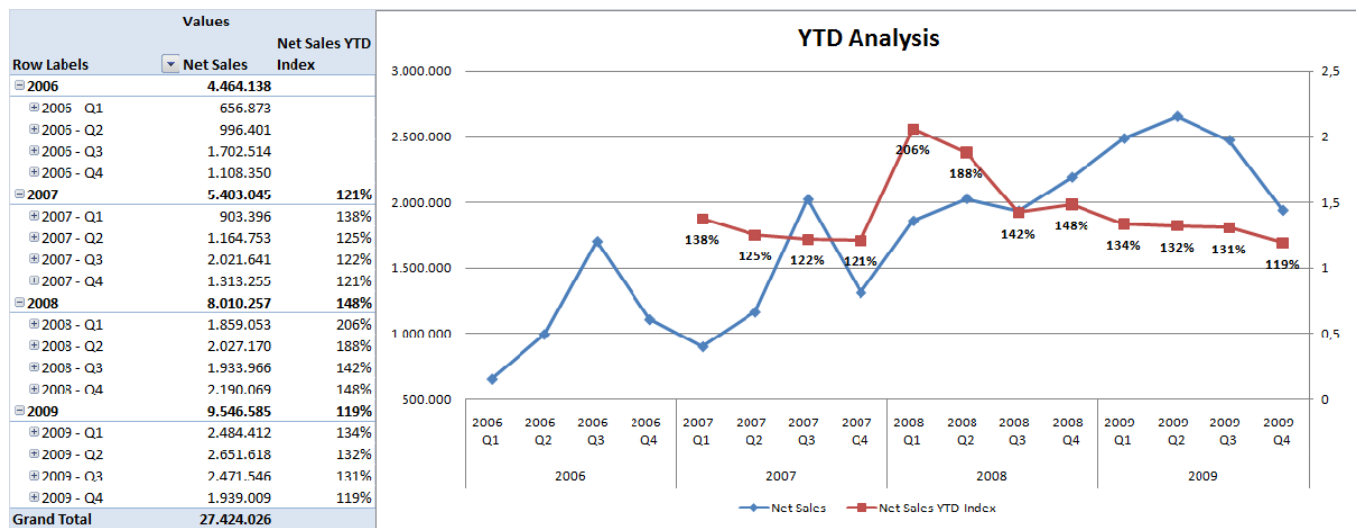
9.1.1 Exercise 1

Create new report: Sales YTD analysis

Measures: Net sales, Net sales YTD index

Dimensions: Date

NOTE (Format the chart and add data labels to match the picture)



9.1.2 Exercise 2

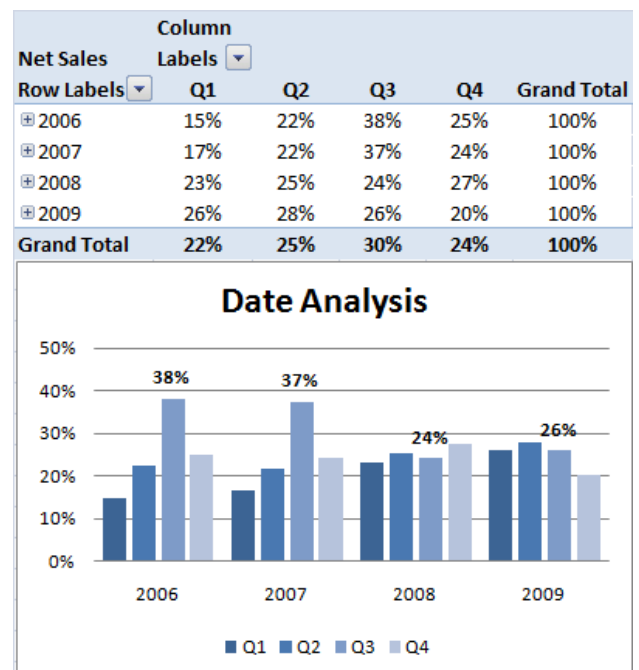
Create new report: Date trend analysis

Measures: Date (YMD), Date Quarter (separate dimension)

Dimensions: Net sales (HINT: displayed as percentage)

NOTE (Format the chart and add data labels to match the picture)

Try to find out your seasonal KPI.



9.1.3 Exercise 3

Create new report: Top items by category group analysis

Measures: Net sales

Dimensions: Item by category product group, Item GL resource asset, Date

NOTE (Format cross table to match the picture)

Item GL Resource Asset	Item				
Net Sales		Column Labels			
Row Labels		2006	2007	2008	2009
FURNITURE - Office furniture		1.767.527	2.201.397	2.844.488	3.275.088
SW - Software		984.579	1.209.113	2.617.888	2.829.729
SPORT - Sport		1.093.321	1.206.552	1.270.096	1.842.612
HW - Hardware		114.566	144.150	336.032	535.835
MUSIC - Music hardware		129.986	159.103	286.306	345.570
PAINT - Paint		8.573	10.501	5.342	5.390
Grand Total		4.098.553	4.930.815	7.360.153	8.834.224

9.1.4 Exercise 4

Create new report: Top 80 % Items by Net sales over years

Measures: Net sales

Dimensions: Item, Item GL resource asset, Date

NOTE (Format cross table to match the picture)

Item GL Resource Asset	Item				
Net Sales		Column Labels			
Row Labels		2006	2007	2008	2009
766BC-NAV - BI4Dynamics NAV		680.244	815.318	1.785.742	1.798.194
1001 - Touring Bicycle		491.800	575.400	877.600	1.294.000
1000 - Bicycle		456.563	456.563	135.000	240.195
1896 S - ATHENS Desk		206.847	259.344	383.114	424.058
1972-W - SAPPORO Whiteboard, black		149.437	164.108	380.416	456.743
1996-S - ATLANTA Whiteboard, base		189.999	255.780	239.051	317.390
766BC-AX - BI4Dynamics AX		119.144	140.416	304.965	433.672
1988-W - CALGARY Whiteboard, yellow		108.495	141.833	282.156	312.033
766BC-CRM - BI4Dynamics CRM		98.446	137.742	286.025	291.315
1984-W - SARAJEVO Whiteboard, blue		67.846	94.312	213.676	227.031
1992-W - ALBERTVILLE Whiteboard, green		43.037	46.352	250.426	262.367
1968-W - GRENOBLE Whiteboard, red		78.374	85.831	176.244	222.401
1920-S - ANTWERP Conference Table		102.641	113.487	79.287	90.743
1906 S - ATHENS Mobile Pedestal		104.428	127.643	46.150	68.619
1900 S - PARIS Guest Chair, black		36.279	45.299	92.637	101.650
8920-W - Server - Teamwear Package		42.969	52.232	68.185	89.798
1100 - Front Wheel		24.250	24.250	113.700	87.855
1928-W - ST.MORITZ Storage Unit/Drawers		32.346	42.369	82.686	90.964
1200 - Back Wheel		36.320	45.000	64.460	97.580
1972-S - MUNICH Swivel Chair, yellow		43.827	60.066	64.079	72.100
1150 - Front Hub		58.300	74.200	45.550	56.995
1964-W - INNSBRUCK Storage Unit/G.Door		40.953	40.953	51.976	65.583
LS-S15 - Stand for Loudspeakers LS-150		24.964	33.970	61.620	66.360
Grand Total		3.237.507	3.832.467	6.084.743	7.167.646

9.1.5 Exercise 5

Create new report: Top 10 customers by net sales over years

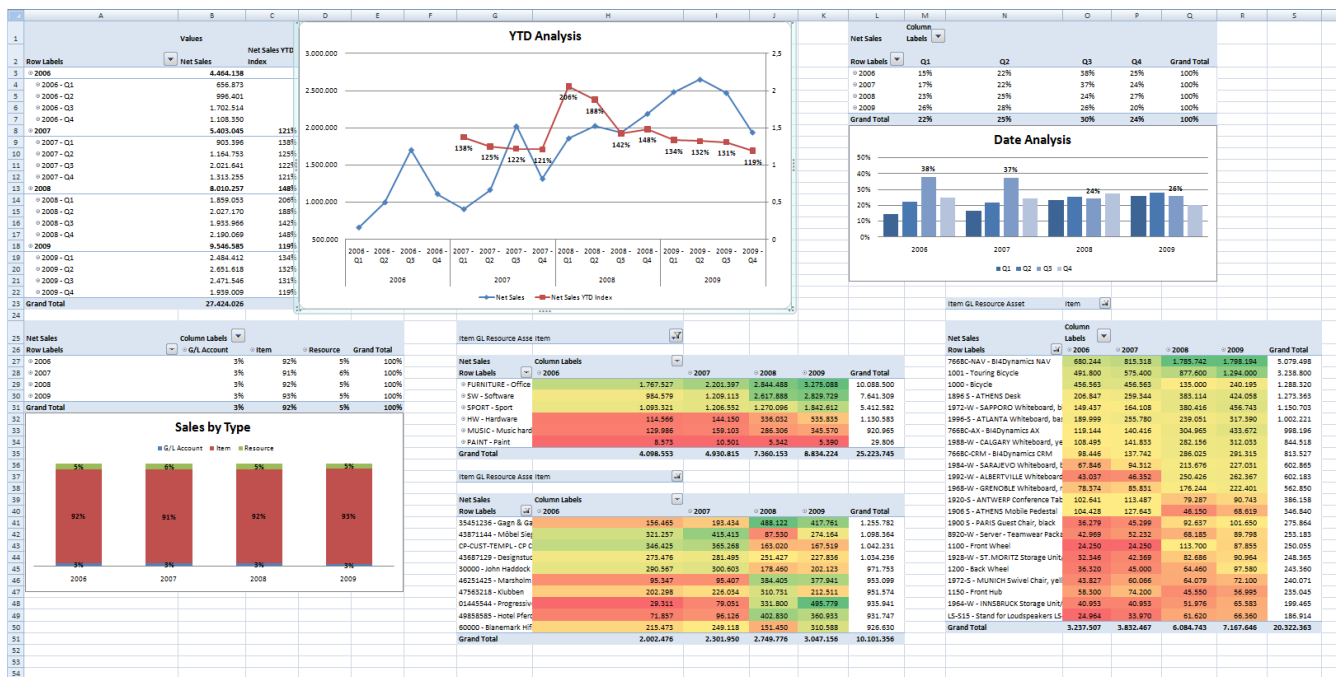
Measures: Net sales

Dimensions: Item GL resource asset, Sell to customer, date

NOTE (Format cross table to match the picture)

Item GL Resource Asset	Item				
Net Sales	Column Labels				
Row Labels	2006	2007	2008	2009	Grand Total
35451236 - Gagn & Gaman	156.465	193.434	488.122	417.761	1.255.782
43871144 - Möbel Siegfried	321.257	415.413	87.530	274.164	1.098.364
CP-CUST-TEMPL - CP Customer Template	346.425	365.268	163.020	167.519	1.042.231
43687129 - Designstudio Gmunden	273.476	281.495	251.427	227.836	1.034.236
30000 - John Haddock Insurance Co.	290.567	300.603	178.460	202.123	971.753
46251425 - Marsholm Karmstol	95.347	95.407	384.405	377.941	953.099
47563218 - Klubben	202.298	226.034	310.731	212.511	951.574
01445544 - Progressive Home Furnishings	29.311	79.051	331.800	495.779	935.941
49858585 - Hotel Pferdesee	71.857	96.126	402.830	360.933	931.747
60000 - Blanemark Hifi Shops	215.473	249.118	151.450	310.588	926.630
Grand Total	2.002.476	2.301.950	2.749.776	3.047.156	10.101.356

9.1.6 Sales Dashboard overview



9.2 Inventory cube

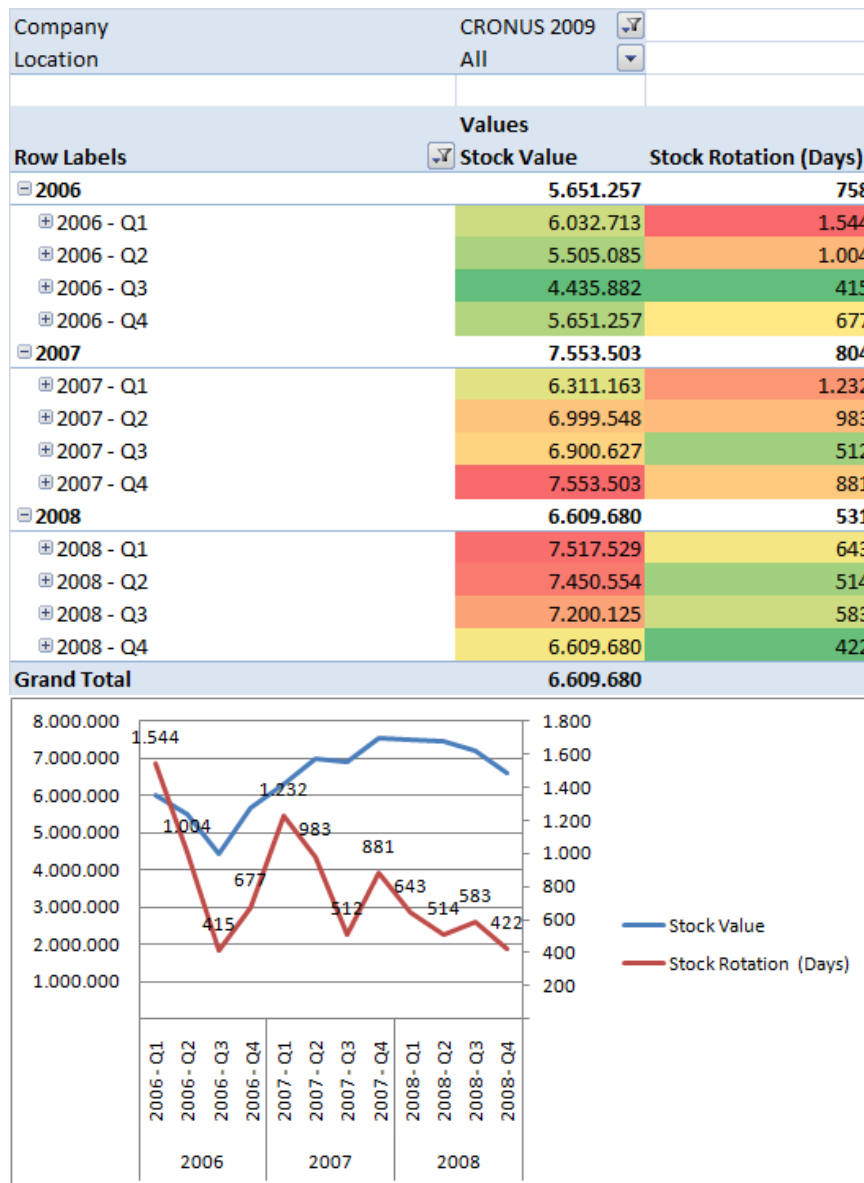
9.2.1 Exercise 1

Create new report: Inventory trend analysis

Measures: stock value, stock rotation (days)

Dimension: Date (YQMD), Company (Cronus 2009), Location (all), Insert line chart

NOTE (Format the chart and add data labels to match the picture)



9.2.2 Exercise 2

Create new report: Inventory trend over years by location

Filter: top 5 locations by stock value

Measures: Stock value

Dimensions: Company, Location, date

Conditional formatting: Data bars

NOTE (Format the chart and cross table to match the picture)

Company	CRONUS 2009			
Stock Value	Column Labels			
Row Labels	± 2006	± 2007	± 2008	Grand Total
YELLOW - Yellow Warehouse	1,729.368	2,288.737	1,972.286	1,972.286
SILVER - Silver Warehouse	957.014	1,441.817	1,446.058	1,446.058
OWN LOG. - Own Logistics	1,019.387	1,667.154	1,444.088	1,444.088
GREEN - Green Warehouse	1,024.147	1,537.500	1,289.076	1,289.076
BLUE - Blue Warehouse	741.111	556.491	419.778	419.778
Grand Total	5,471.028	7,491.699	6,571.286	6,571.286

9.2.3 Exercise 3

Inventory trend over Item by Vendor

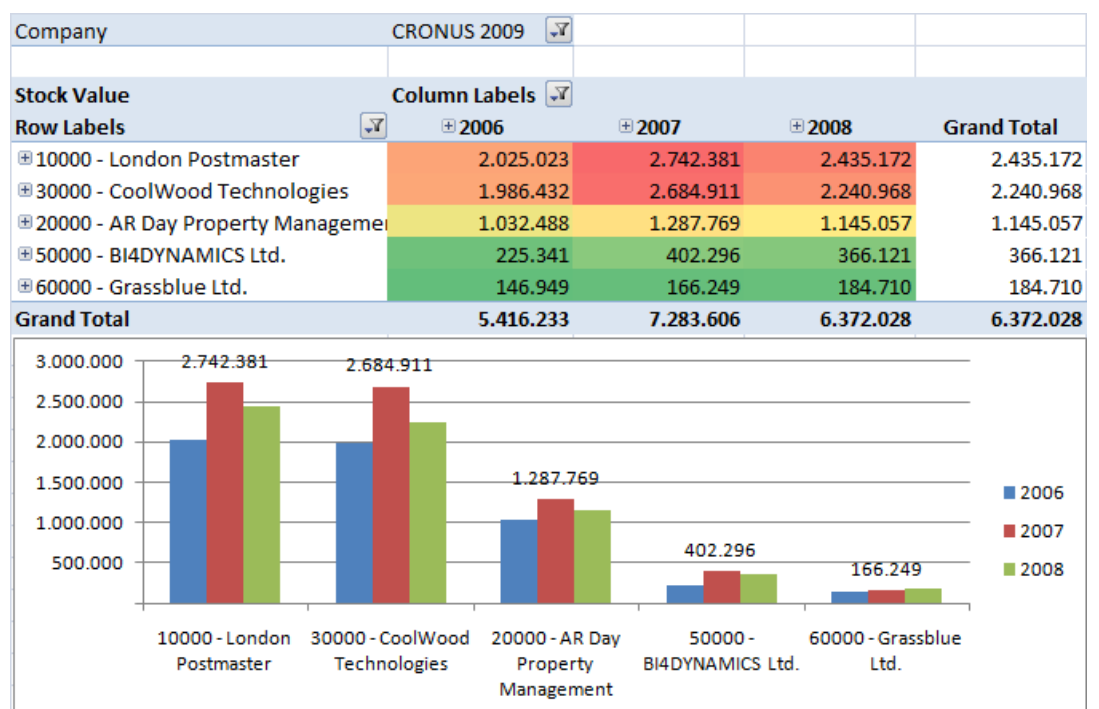
Filter: Top 5 vendors by stock value

Measures: Stock value

Dimensions: Item by vendor, Date, Company

Insert bar chart

NOTE (Format the chart and cross table to match the picture)



9.2.4 Exercise 4

Create new report: Inventory stock value over Item by vendor and over Location for year 2008

Filter: Top 5 Locations by stock value

Measures: Stock value

Dimensions: Company, Date, Item by vendor, Location

NOTE (Format the chart and cross table to match the picture)

Date YQMD	2008	
Company	CRONUS 2009	
Stock Value	Column Labels	
10000 - London		
Row Labels	Postmaster	Grand Total
SILVER - Silver Warehouse	690.182	690.182
GREEN - Green Warehouse	586.502	586.502
OWN LOG. - Own Logistics	474.544	474.544
YELLOW - Yellow Warehouse	407.310	407.310
BLUE - Blue Warehouse	272.600	272.600
RED - Red Warehouse	3.606	3.606
WHITE - White Warehouse	427	427
Grand Total	2.435.172	2.435.172

9.2.5 Exercise 5

Create new report: Item by vendor (London Postmaster) by location (Silver) for year 2008 over stock value and stock rotation (days).

Filter: top 5 items by stock rotation (days)

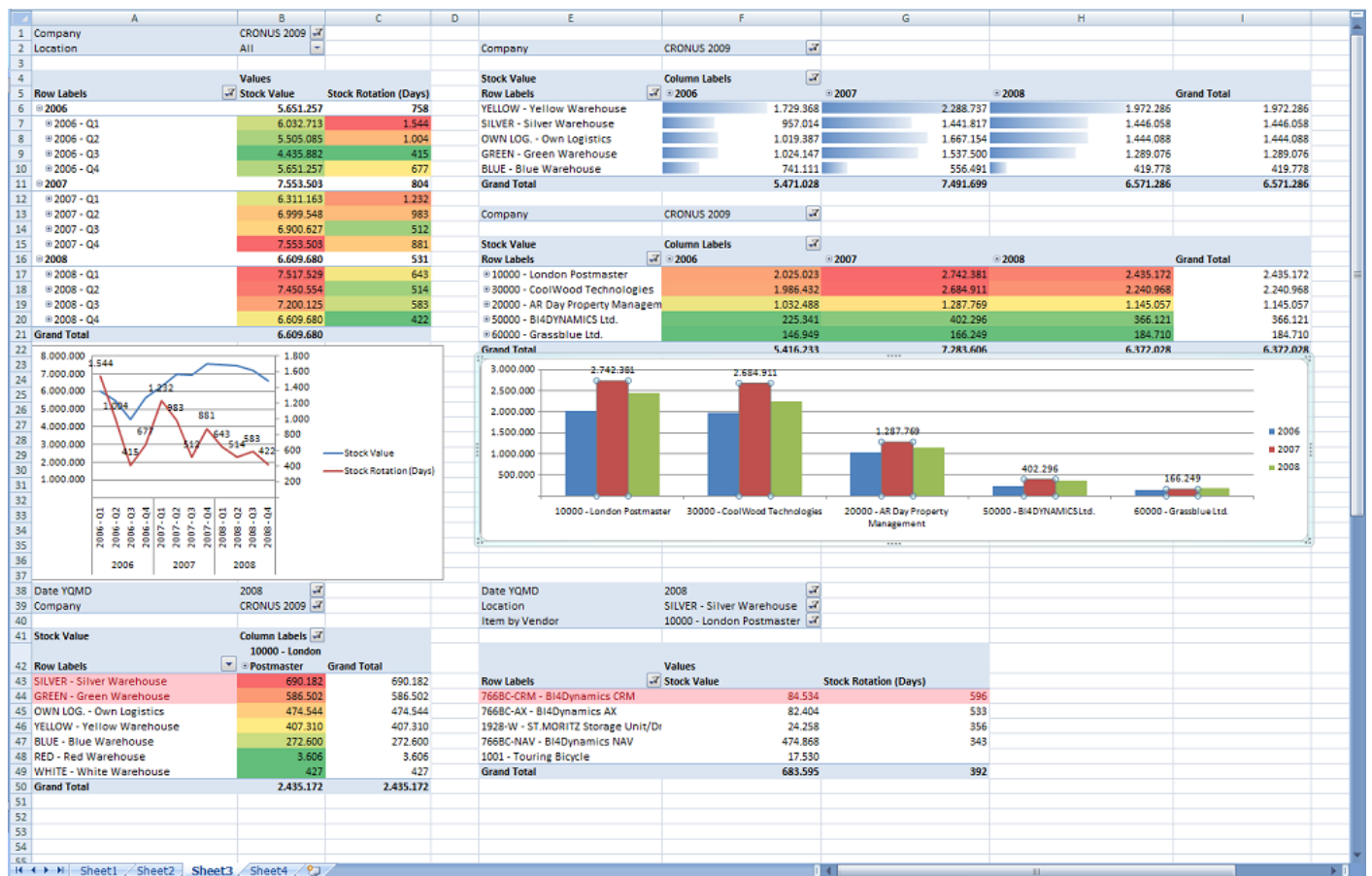
Measures: Stock value, Stock rotation (days)

Dimensions: Date, Location, Item by vendor, Item

NOTE (Format the chart and cross table to match the picture)

Date YQMD	2008	
Location	SILVER - Silver Warehouse	
Item by Vendor	10000 - London Postmaster	
Values		
Row Labels	Stock Value	Stock Rotation (Days)
766BC-CRM - BI4Dynamics CRM	84.534	596
766BC-AX - BI4Dynamics AX	82.404	533
1928-W - ST.MORITZ Storage Unit/Drav	24.258	356
766BC-NAV - BI4Dynamics NAV	474.868	343
1001 - Touring Bicycle	17.530	
Grand Total	683.595	392

9.2.6 Inventory Dashboard overview



9.3 General ledger/Account schedules cube

9.3.1 Exercise 1

Create new report: Balance sheet by multiple measures for Budget v1, year 2009 and company Cronus 2009

Measures: Net change, debit, credit, Net change last YTD, Net change YTD, Net Change YTD index
Dimensions: GL account by levels, Company, GL Budget, Date YMD

NOTE (Format cross table to match the picture)

Date YMD	2009					
	2009-1 - 2009 v1					
GL Budget	(July 2008)					
Company	CRONUS 2009					
Values						
Row Labels	Net Change	Debit	Credit	Net Change Last YTD	Net Change YTD	Net Change YTD Index
10 - BALANCE SHEET	1.888.444	20.960.929	19.072.486	1.178.173	1.888.444	160%
100 - ASSETS	3.502.347	19.302.882	15.800.535	2.772.812	3.502.347	126%
1000 - Fixed Assets	-19.398		19.398	-19.401	-19.398	100%
2000 - Current Assets	3.521.745	19.302.882	15.781.137	2.792.213	3.521.745	126%
300 - EQUITY AND LIABILITIES	-1.613.904	1.658.047	3.271.951	-1.594.639	-1.613.904	101%
5000 - Liabilities	-1.613.904	1.658.047	3.271.951	-1.594.639	-1.613.904	101%
60 - INCOME STATEMENT	-1.888.444	9.103.553	10.991.996	-1.178.173	-1.888.444	160%
600 - REVENUE	-9.546.585	767.067	10.313.652	-8.010.257	-9.546.585	119%
6100 - Sales of Retail	-9.609.955	20.038	9.629.993	-8.051.371	-9.609.955	119%
6200 - Sales of Raw Materials	-212.724	258	212.983	-199.898	-212.724	106%
6400 - Sales of Resources	-468.544	1.724	470.268	-426.451	-468.544	110%
6900 - Discounts	744.637	745.046	409	667.462	744.637	112%
700 - COSTS	7.058.141	7.736.486	678.344	6.232.084	7.058.141	113%
7000 - COGS	5.615.461	6.293.805	678.344	4.996.004	5.615.461	112%
8000 - OPERATING COSTS	1.442.681	1.442.681		1.236.080	1.442.681	117%
900 - FINANCIAL ITEMS	600.000	600.000		600.000	600.000	100%
9000 - Interest, Gains & Losses	600.000	600.000		600.000	600.000	100%
Grand Total		30.064.482	30.064.482			

9.3.2 Exercise 2

Create new report: GL account by level over multiple companies in year 2009

Measures: Net change

Dimensions: GL by account, Company, GL budget, Date YMD

NOTE (Format cross table to match the picture)

Date YMD	2009		
	2009-2 - 2009 v2		
GL Budget	(Jan 2009)		
Net Change	Column Labels		
		CRONUS	
Row Labels	<input checked="" type="checkbox"/> CRONUS 2009	Financials	Grand Total
<input checked="" type="checkbox"/> 60 - INCOME STATEMENT	-1.888.444	-1.001.523	-2.889.967
<input checked="" type="checkbox"/> 600 - REVENUE	-9.546.585	-5.208.379	-14.754.964
⊕ 6100 - Sales of Retail	-9.609.955	-5.236.440	-14.846.394
⊕ 6200 - Sales of Raw Materials	-212.724	-119.902	-332.626
⊕ 6400 - Sales of Resources	-468.544	-266.623	-735.167
⊕ 6900 - Discounts	744.637	414.585	1.159.222
<input checked="" type="checkbox"/> 700 - COSTS	7.058.141	3.862.543	10.920.684
<input checked="" type="checkbox"/> 7000 - COGS	5.615.461	3.034.841	8.650.302
⊕ 7105 - Cost of Retail	5.495.751	2.967.255	8.463.006
⊕ 7205 - Cost of Raw Materials	120.533	68.049	188.582
⊕ 7705 - Cost of Capacities	-823	-463	-1.286
<input checked="" type="checkbox"/> 8000 - OPERATING COSTS	1.442.681	827.701	2.270.382
⊕ 8001 - Operating Expenses	635.427	364.527	999.953
⊕ 8700 - Personnel Expenses	787.856	452.168	1.240.024
⊕ 8800 - Depreciation of Fixed Assets	19.398	11.007	30.405
<input checked="" type="checkbox"/> 900 - FINANCIAL ITEMS	600.000	344.314	944.314
⊕ 9000 - Interest, Gains & Losses	600.000	344.314	944.314
Grand Total	-1.888.444	-1.001.523	-2.889.967

9.3.3 Exercise 3

Account Schedules

Create new report: Account schedules PL over Business group for Cronus 2009 in year 2009

Measures: Net change

Dimensions: Date YMD, Company, Dim Area, Business group

NOTE (Format cross table to match the picture)

Date YMD	2009				
Company	CRONUS 2009				
Dim AREA	All				
Net Change	Column Labels				
Row Labels	HOME - Home	INDUSTRIAL - Industrial	INTERCOMPANY - Intercompany	OFFICE - Office	Grand Total
PL	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
100 - REVENUE (101+107)	-1.245.709	-4.001.955	-839.878	-4.203.680	-10.291.222
101 - Sales (102+103+104+105+106)	-1.245.709	-4.001.955	-839.878	-4.203.680	-10.291.222
102 - Retail	-1.171.887	-3.784.022	-774.316	-3.879.730	-9.609.955
103 - Raw Materials	-24.889	-50.307	-27.626	-109.902	-212.724
104 - Resources	-48.933	-167.627	-37.936	-214.048	-468.544
201 - Cost (202+203+204+205+206+207)	664.033	2.152.186	510.474	2.288.767	5.615.461
202 - Retail	650.013	2.122.015	495.391	2.227.510	5.494.928
203 - Raw Materials	14.021	30.171	15.083	61.258	120.533
208 - GROSS INCOME	-581.675	-1.849.769	-329.404	-1.914.913	-4.675.761
300 - EXPENSES (301+307+308)		7.677		1.674.341	1.682.018
301 - Operating expenses (302+303+304+305+306)		7.677		627.350	635.027
302 - Building Maintenance				32.994	32.994
303 - Administrative		7.677		3.876	11.553
304 - Computer				248.463	248.463
305 - Selling				56.514	56.514
306 - Vehicle				26.367	26.367
307 - Other Operating				259.135	259.135
308 - Personnel				787.856	787.856
310 - Net income before operations	-581.675	-1.842.092	-329.404	-240.572	-2.993.744
500 - NET INCOME	-581.675	-1.842.092	-329.404	-240.572	-2.993.744
Grand Total	-581.675	-1.842.092	-329.404	-499.707	-3.252.879

9.3.4 Exercise 4

Account schedules over multiple companies in year 2009

Measures: Net change

Dimensions: Date, Company, Account schedules (COST)

NOTE: Format cross table to match the picture

Date YMD	2009		
GL Budget	(Multiple Items)		
Date YMD	2009		
GL Budget	All		
Net Change			
Column Labels			
Row Labels	CRONUS 2009	CRONUS Financials	Grand Total
COST	#VALUE!	#VALUE!	#VALUE!
801 - Building Maintenance	32.994	18.930	51.924
802 - Administrative	11.553	6.615	18.168
803 - Computer	248.463	142.666	391.129
804 - Selling	56.514	32.249	88.763
805 - Vehicle	26.767	15.245	42.013
806 - Other Operating	259.135	148.821	407.956
807 - Personnel	787.856	452.168	1.240.024
808 - Fixed Asset Depreciation	19.398	11.007	30.405
OC - Operating costs	1.442.681	827.701	2.270.382
COGS - COGS	5.615.461	3.034.841	8.650.302
C - Cost (Operating costs + COGS)	7.058.141	3.862.543	10.920.684
F - Financial Items	600.000	344.314	944.314
TC - Total Cost (COGS + Operating Cost + Financial Items)	7.658.141	4.206.856	11.864.998
REVENUE - Revenue	9.546.585	5.208.379	14.754.964
Personnel exp./ Revenue			
Operating Costs / Revenue			
COGS / Revenue	59%	58%	59%
Costs / Revenue	74%	74%	74%
Financial Items / Revenue	6%	7%	6%
Total Cost/Revenue	80%	81%	80%
Personnel exp./Total Cost	10%	11%	10%
Operating Costs / Total Cost	19%	20%	19%
COGS/Total Cost	73%	72%	73%
Financial Items/Total Cost	8%	8%	8%
Personnel exp./ Cost	11%	12%	11%
Operating Costs / Cost	20%	21%	21%
COGS / Cost	80%	79%	79%
Building Maintenance/ Operating costs	2%	2%	2%
Administrative/ Operating costs	1%	1%	1%
Computer/ Operating costs	17%	17%	17%
Selling/ Operating costs	4%	4%	4%
Vehicle/ Operating costs	2%	2%	2%
Other Operating/ Operating costs	18%	18%	18%
Personnel exp./ Operating costs	55%	55%	55%
Fixed Asset Depreciation/ Operating costs	1%	1%	1%
Grand Total	-1.888.444	-1.001.523	-2.889.967