

Activity A02_Discount_Modeling_&Analysis

In Activity A01_Simple_Revenue_Analysis we looked at the Volume, Net Revenue and Variance for a set of products which are sold through outlets in a number of cities over a 2 year period. We discovered that the product which had the greatest decrease in volume sold was not the same product that showed the biggest decrease in Net Revenue. To fully understand this and make appropriate business decisions further information is required. Maybe some cities are giving over generous discounts? To find out more detail we will bring in List Prices from the previous 2 years and use them to calculate the Gross revenue. The difference between the Gross and Net revenue will be the discount that was given. For additional information we will also calculate the discount %. This will give us more insight into how the different cities are discounting the products so that we can then take appropriate action.

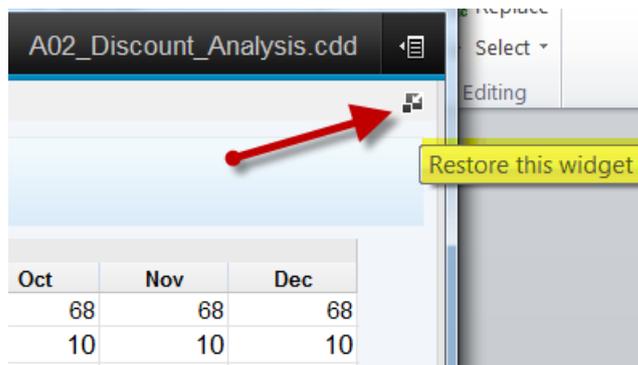
Outline steps and screenshots.

1. Open A01_Simple_Revenue_Analysis.cdd and **Save As** A02_Discount_Analysis.cdd
2. Add a new tab rename it **Discount Analysis**
3. Drag the List_Prices.csv file onto the workspace of this new tab.
4. Change the Display View to Crosstab.
5. Delete the **Count** from the List Price Measures dimension.
6. Place the List Price dimension onto the columns and delete the **Total of List Price** member.
7. Arrange the view as per screen shot.

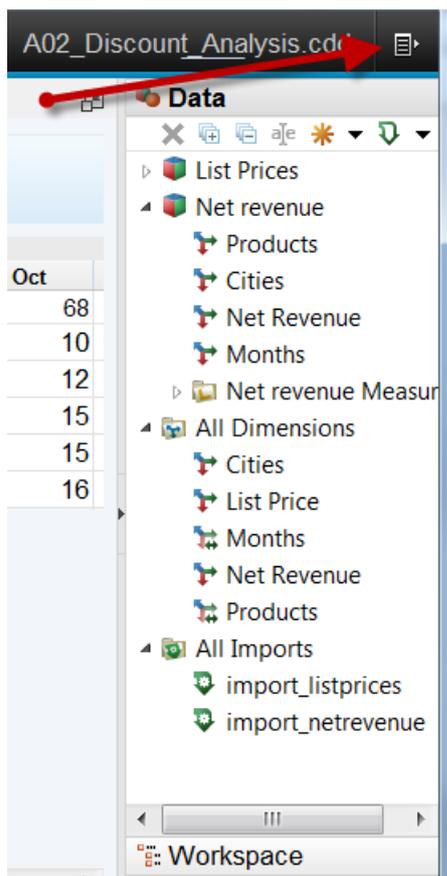
The screenshot shows a Crosstab view in IBM Cognos Insight. The table displays sales data for various products across the months of the year. The 'Total of Products' row is highlighted in blue.

	Total of Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total of Products	810	66	67	67	67	67	68	68	68	68	68	68	68
Artful Artifacts	119	9	10	10	10	10	10	10	10	10	10	10	10
Whacky Widgets	144	12	12	12	12	12	12	12	12	12	12	12	12
Thoughtful Things	175	14	14	14	14	14	15	15	15	15	15	15	15
Potty Possessions	180	15	15	15	15	15	15	15	15	15	15	15	15
Ominous Objects	192	16	16	16	16	16	16	16	16	16	16	16	16

8. Click the **Restore this widget** icon and position the List Prices so that it takes the top half of the pane

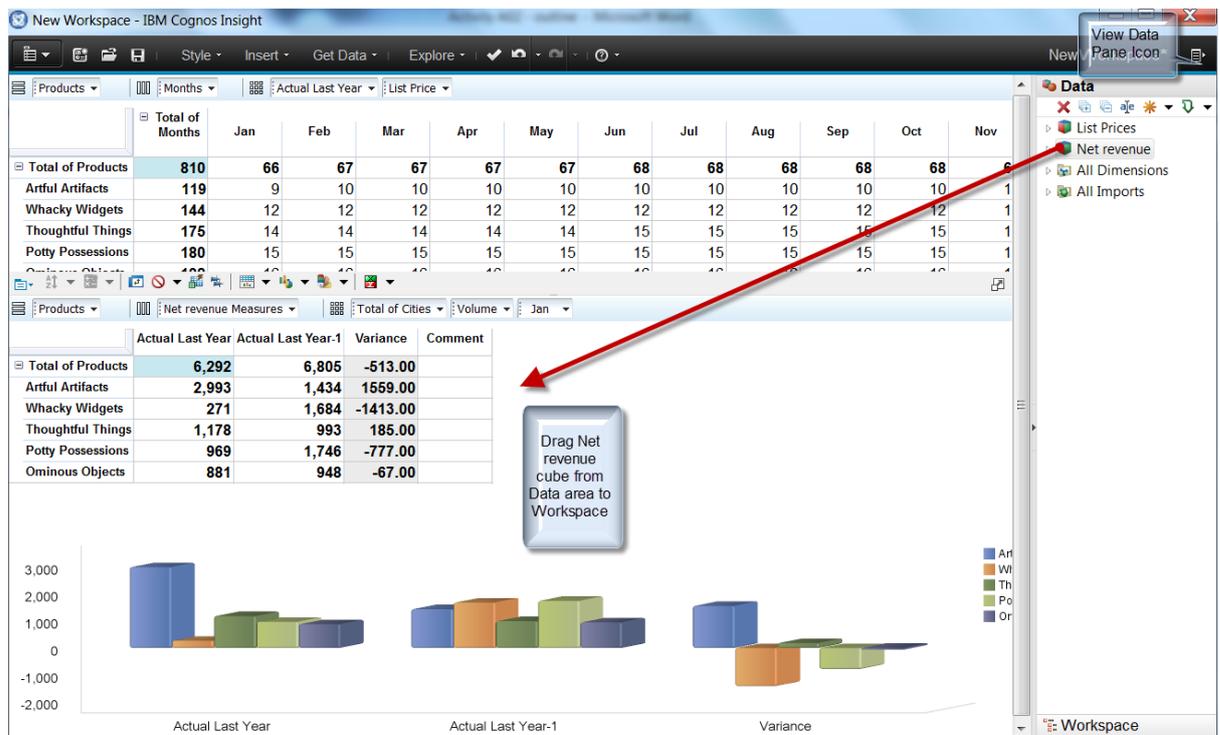


9. Click on the View Content Pane icon (top left of workspace). You will see the objects associated with this Workspace.



10. Drag the Net Revenue cube to the workspace and arrange in the bottom half of the pane.

IBM Cognos TM1 Enablement Program – Activity A02



11. Change the display of the Net Revenue cube to Crosstab and re-orientate as shown below

The screenshot shows the workspace with the 'Net Revenue' cube selected. The view is a Crosstab. The filters are 'Net revenue Measures', 'Total of Cities', 'Total of Products', and 'Jan'. The table below shows the data for 'Volume' and 'Net Revenue'.

	Actual Last Year	Actual Last Year-1	Variance	Comment
Volume	6,292	6,805	-513.00	
Net Revenue	72,672	73,331	-659.00	

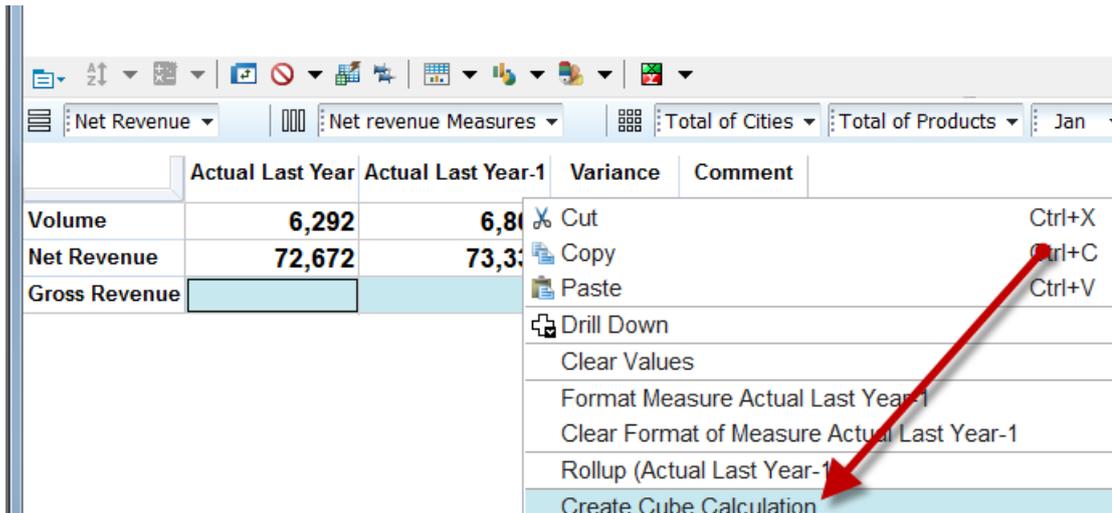
12. Right click on the Net Revenue Member and select insert

13. Name the new member **Gross Revenue**

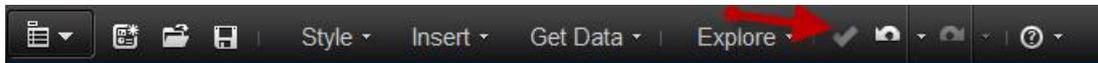
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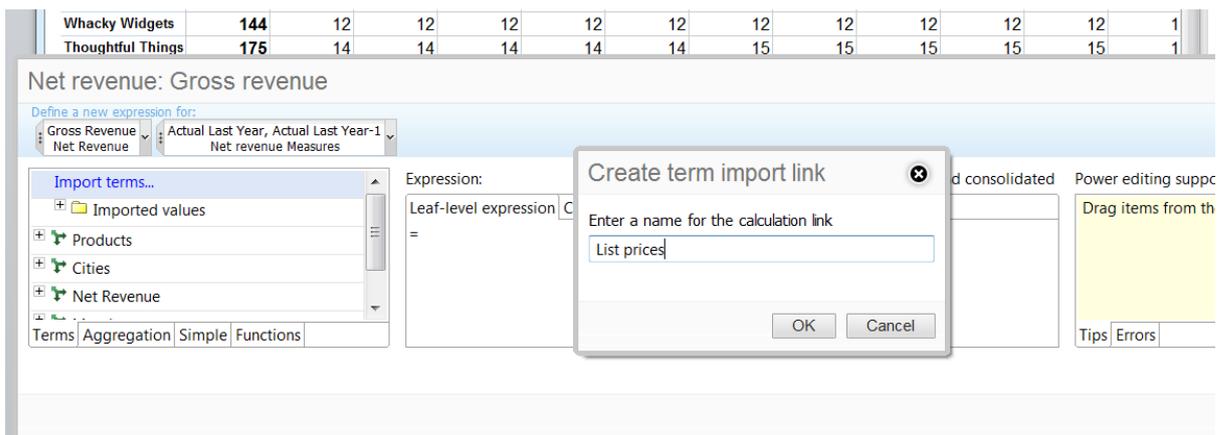
- Highlight the two cells of Actual Last Year and Actual Last Year -1 for the **Gross Revenue** item, right click and select Create Cube Calculation.



- We will calculate the Gross revenue as the Volume * List Price. The list price can be used directly from the List Price Cube.
- If asked to save the pending changes then commit data by clicking the icon on the main menu bar (see screen shot below)



- Name the calculation **Gross Revenue** and select OK.
- Click on Import Terms and call the Term import link **List Prices**



- On the source select the List Price cube from the drop down. Note Products and Months automatically map.
- Drag List Price Measures onto Net revenue measures and select automatic for mapping type.

21. Click List Price and select the List Price slice

Define a Link for Importing Terms

Name:

List Prices

Dimensions:

- Products
- Months
- List Prices Measures
- List Price

Members:

Name	Slice
List Price	<input checked="" type="checkbox"/>

Net revenue

Dimensions:

- Products
- Months
- Net revenue Measures
- Cities
- Net Revenue

Members:

Name	Links
Actual Last Year	1
Actual Last Year-1	1
Variance	
Comment	

The screenshot shows two side-by-side dimension panels. The left panel is for 'List Prices' and the right is for 'Net revenue'. Blue arrows point from 'Products', 'Months', and 'List Prices Measures' in the left panel to their counterparts in the right panel. A red arrow points from the 'List Price' member in the left panel's 'Members' table to the 'List Price' member in the right panel's 'Members' table.

22. Click Cities and select the root of the Cities dimension

Define a Link for Importing Terms

Name:

Left Panel: List Prices

Dimensions:	
Products	
Months	
List Prices Measures	
List Price	

Members:	
Name	Slice
List Price	<input checked="" type="checkbox"/>

Right Panel: Net revenue

Dimensions:	
Products	
Months	
Net revenue Measures	
Cities	
Net Revenue	

Members:	
Name	Slice
Total of Cities	<input checked="" type="checkbox"/>
London	<input checked="" type="checkbox"/>
Liverpool	<input checked="" type="checkbox"/>
Bristol	<input checked="" type="checkbox"/>
Newcastle	<input checked="" type="checkbox"/>
Birmingham	<input checked="" type="checkbox"/>
Manchester	<input checked="" type="checkbox"/>

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23. Click Net Revenue and select the Gross Revenue slice

Define a Link for Importing Terms

Name: List Prices

List Prices

Dimensions:

- Products
- Months
- List Prices Measures
- List Price

Members:

Name	Slice
List Price	<input checked="" type="checkbox"/>

Net revenue

Dimensions:

- Products
- Months
- Net revenue Measures
- Cities
- Net Revenue

Members:

Name	Slice
Volume	<input type="checkbox"/>
Net Revenue	<input type="checkbox"/>
Gross Revenue	<input checked="" type="checkbox"/>

24. Select OK to save the Import link.

25. In the calculation expand the Import terms and drag List prices to the Leaf-level expression

Net revenue: Gross revenue

Define a new expression for:

Gross Revenue Net Revenue Actual Last Year, Actual Last Year-1 Net revenue Measures

Import terms...

- Imported values
 - List Prices
- Products
- Cities

Expression:

Leaf-level expression | Consolidation

=LINK('List Prices')

26. Complete the calculation as follows, typing in the * for multiplying the two values or selecting it from the simple tab and the arithmetic options

Net revenue: Gross revenue

Define a new expression for:

Gross Revenue Net Revenue Actual Last Year, Actual Last Year-1 Net revenue Measures

Import terms...

- Imported values
 - List Prices
- Products
- Cities
- Net Revenue
 - Attributes
 - Volume
 - Net Revenue
 - Gross Revenue
- Months

Expression: Combine

Leaf-level expression Consolidated-level expression String expression

=LINK('List Prices') * netrevenue:Volume

Net Revenue: Gross Revenue

Define a new expression for:

Gross Revenue Net Revenue Actual Last Year, Actual Last Year-1 Net Revenue Measures

Operation type: Arithmetic

Operation:

- + (Sum)
- (Difference)
- * (Multiplication)
- / (Division)

Expression: Combine leaf and consolid

Leaf-level expression Consolidated-level expression String expression

=LINK('List Prices') * [Net Revenue]:Volume

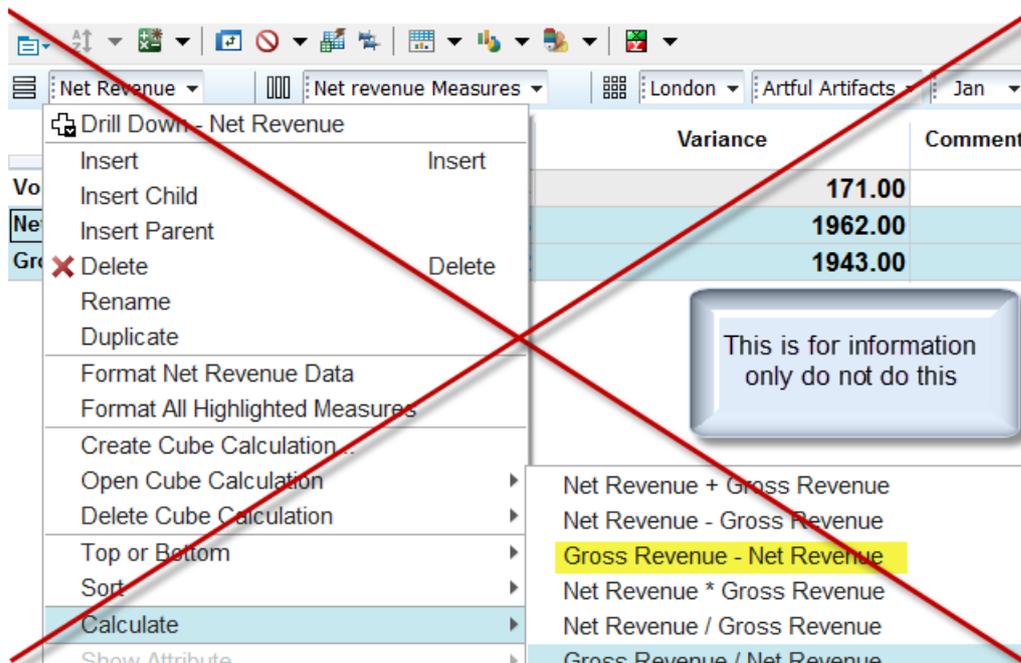
Terms Aggregation Simple Functions

27. Hit OK and check the result at the detail level. Here is an example:

	Actual Last Year	Actual Last Year-1	Variance	Comment
Volume	575	404	171.00	
Net Revenue	4,958	2,996	1962.00	
Gross Revenue	5,175	3,232	1943.00	

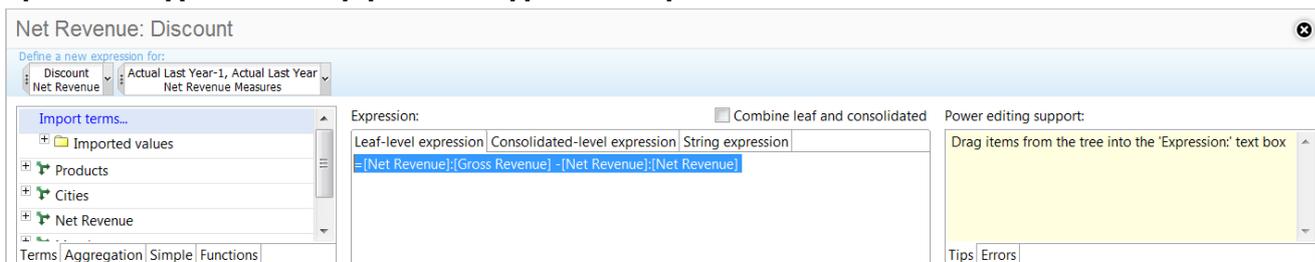
Now we will calculate the difference between the Net Revenue and Gross revenue which represents the Discount that was given. There are 2 ways of doing this. We could select the predefined Calculation of Gross Revenue – Net revenue from the Right Mouse menu (see screen shot method 1 below). This will then apply to the Discount across all members in the other dimensions. However as we develop this model we plan to add new members to the Net Revenue Measures dimension (which is acting as versions in this model) for future planning. For these slices we will want Discount to be entered rather than calculatd. By using a cube calculation (see screen shot Method 2 below) for this we will be able to control the scope of the calculation so that it only apply to the Actual slices leaving the planning items available for data entry.

Method 1 For information only – do not do this step. You could use Calculate which will apply the calculation of Discount across all members of other dimensions.



28. **Method 2 – Do this step.** Right click the Gross Revenue item and select **Insert**. Call the new item **Discount**
29. Highlight only the Actual last Year and Actual Last Year-1 for the Discount item to fix the scope of the calculation. Right click and select create cube calculation. Name it **Discount**.
30. Dragging and dropping from the terms area create the following calculation

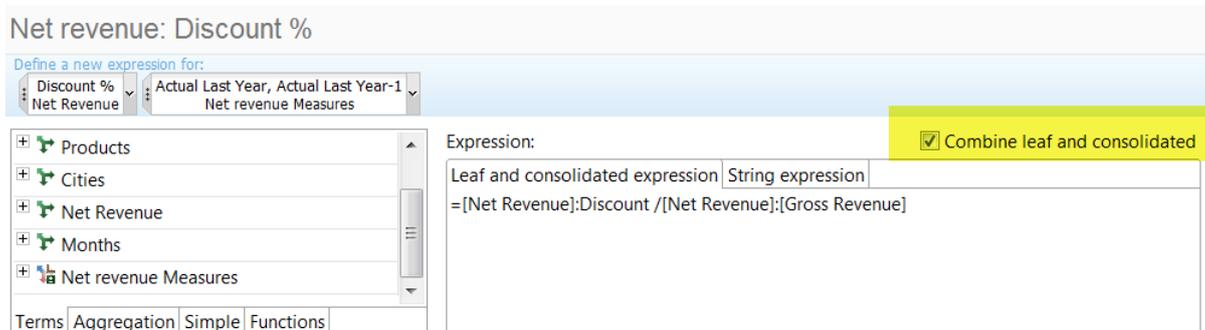
=[Net Revenue]:[Gross Revenue] -[Net Revenue]:[Net Revenue]



31. Hit OK and check the resulting data is calculating correctly.
32. Lastly we will create the Discount%. As we want to apply this to both leaf and consolidated levels once again we will use the Cube calculation rather than just the Calculate function.
33. Right click the Discount item and **Insert**. Call the new item **Discount%**.
34. Highlight only the Actual last Year and Actual Last Year-1 for the Discount % item to fix the scope of the calculation. Right click and select create cube calculation. Name it **Discount%**.
35. Dragging and dropping from the terms area create the following calculation

=[Net Revenue]:Discount / [Net Revenue]:[Gross Revenue]

36. Select the Combine leaf and consolidated check box. (note – if don't apply at consol will sum)



37. Select OK
38. Apply a format to that item by right clicking the Discount% member and selecting Format Discount% data. Select the percentage and 2dp.

As there is a default format automatically applied to the measures dimension at the initial import you will need to clear this for both Actual Last Year and Actual Last Year -1.

39. Right click the Actual Last year item and select **Clear Format Actual Last Year**. Repeat for **Actual Last Year -1**

40. The screen shot below gives an example of the results of the Discount% for London in Jan:

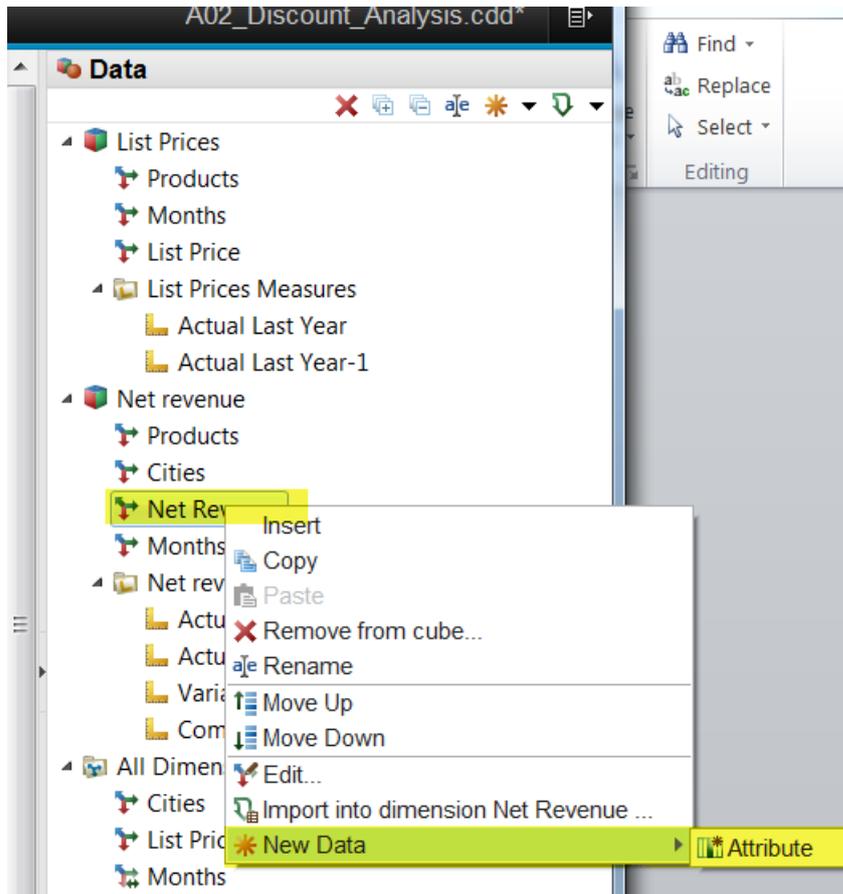
	Actual Last Year	Actual Last Year-1	Variance	Comment
Total of Products	3.02%	4.72%	-1.70%	
Artful Artifacts	4.19%	7.30%	-3.11%	
Whacky Widgets	3.74%	4.02%	-0.28%	
Thoughtful Things	5.14%	10.19%	-5.05%	
Potty Possessions	0.16%	0.00%	0.16%	
Ominous Objects	0.00%	0.79%	-0.79%	

Note that the Variance calculation is always the same Actual last Year – Actual Last Year-1. However we want to bring in business logic into the variance. For example a negative variance for Gross Revenue is a decrease from one year to another and should be represented as a negative. However a decline in discount could be viewed as a positive thing and the variance can be displayed as positive instead of negative. We can use attributes to bring this business logic into our model.

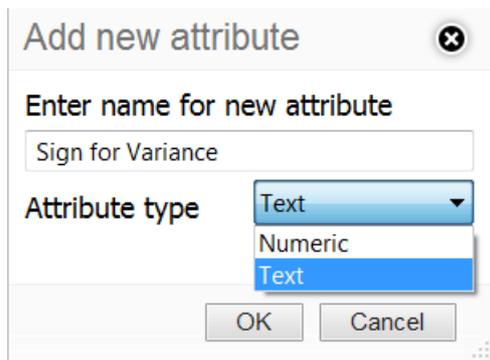
41. Re-orientate to see all of the measures for London, Jan and Whacky Widgets – note that they are all negative.

	Actual Last Year	Actual Last Year-1	Variance	Comment
Volume	49.00	697.00	-648.00	
Net Revenue	566.00	4014.00	-3448.00	
Gross Revenue	588.00	4182.00	-3594.00	
Discount	22.00	168.00	-146.00	
Discount%	3.74%	4.02%	-0.28%	

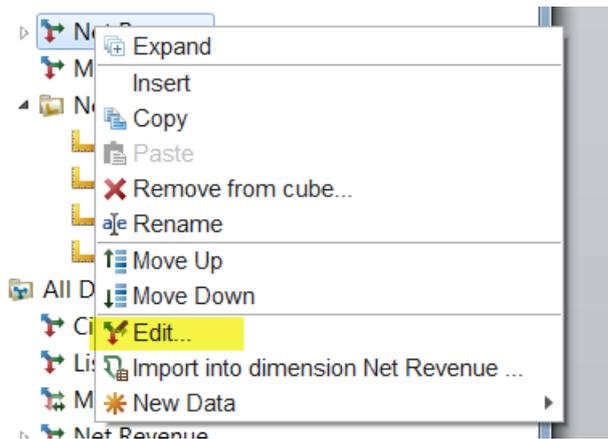
42. Go to the data pane and right click on the **Net Revenue Measures** Dimension, select **New Data** and **Attribute**.



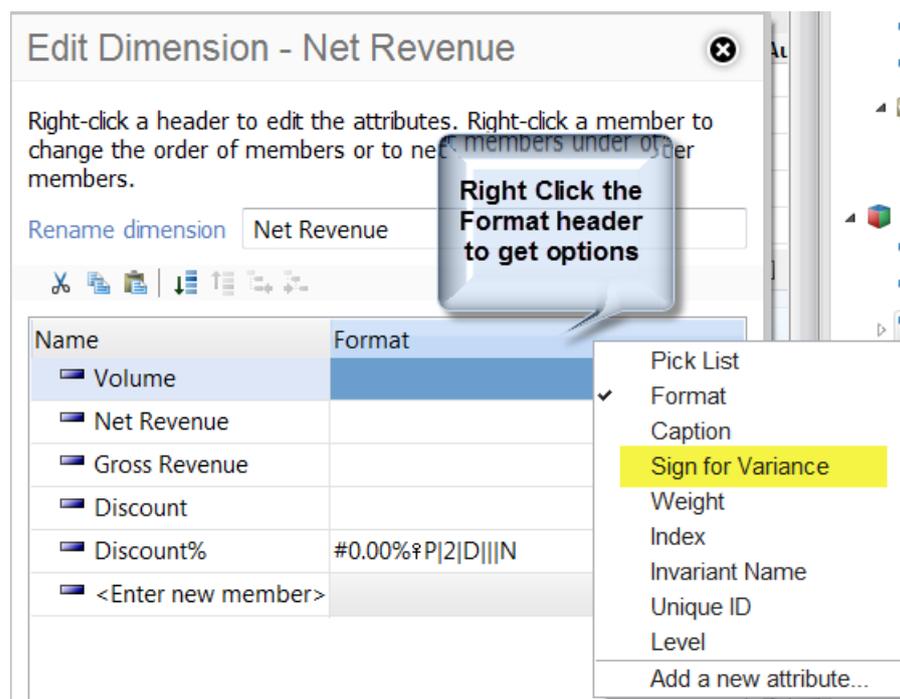
43. Name the attribute **Sign for Variance**, change the Attribute type to **Text** and select OK



44. Right click the **Net Revenue** dimension again and select Edit



45. In the Dimension editor right click the header for Format and select the **Sign for Variance** attribute on the list



46. Populate as per screen shot below.

Edit Dimension - Net Revenue

Right-click a header to edit the attributes. Right-click a member to change the order of members or to nest members under other members.

Rename dimension

Name	Format	Sign for Variance
Volume		Positive
Net Revenue		Positive
Gross Revenue		Positive
Discount		Negative
Discount%	#0.00%#P 2 D N	Negative
<Enter new member>		

47. Select Close.
48. Right click the Variance Column, select Create Cube calculation. Name the calculation Variance.
49. In the Leaf-level expression create the following expression by dragging and dropping the appropriate elements.

Net revenue: Variance

Define a new expression for:
 Variance
 Net revenue Measures

Attributes	Expression:												
<ul style="list-style-type: none"> Actual Last Year Actual Last Year-1 Variance Comment 	<input type="checkbox"/> Combine leaf and consolidated <table border="1"> <thead> <tr> <th>Leaf-level expression</th> <th>Consolidated-level expression</th> <th>String expression</th> </tr> </thead> <tbody> <tr> <td colspan="3">=IF netrevenue.[Sign for Variance] = "Positive"</td> </tr> <tr> <td colspan="3">THEN [netrevenue.measures]:[Actual Last Year] - [netrevenue.measures]:[Actual Last Year-1]</td> </tr> <tr> <td colspan="3">ELSE [netrevenue.measures]:[Actual Last Year-1] - [netrevenue.measures]:[Actual Last Year]</td> </tr> </tbody> </table>	Leaf-level expression	Consolidated-level expression	String expression	=IF netrevenue.[Sign for Variance] = "Positive"			THEN [netrevenue.measures]:[Actual Last Year] - [netrevenue.measures]:[Actual Last Year-1]			ELSE [netrevenue.measures]:[Actual Last Year-1] - [netrevenue.measures]:[Actual Last Year]		
Leaf-level expression	Consolidated-level expression	String expression											
=IF netrevenue.[Sign for Variance] = "Positive"													
THEN [netrevenue.measures]:[Actual Last Year] - [netrevenue.measures]:[Actual Last Year-1]													
ELSE [netrevenue.measures]:[Actual Last Year-1] - [netrevenue.measures]:[Actual Last Year]													

50. Select the Combine leaf and consolidated so that the expression is applied to both.

Expression: Combine leaf and consolidated

Leaf and consolidated expression	String expression
=IF [netrevenue].[Sign for Variance] = "Positive" THEN [netrevenue.measures]:[Actual Last Year] - [netrevenue.measures]:[Actual Last Year-1] ELSE [netrevenue.measures]:[Actual Last Year-1] - [netrevenue.measures]:[Actual Last Year]	

51. Select OK and observe the effect on the Variance data. It should now look as per the screen shot below.

Rows:	Columns:	Context:		
Net Revenue Net Revenue	Net revenue Measures Net revenue Measures	London Cities	Whacky Widgets Products	Jan Months
	Actual Last Year	Actual Last Year-1	Variance	Comment
Volume	49.00	697.00	-648.00	
Net Revenue	566.00	4014.00	-3448.00	
Gross Revenue	588.00	4182.00	-3594.00	
Discount	22.00	168.00	146.00	
Discount%	3.74%	4.02%	0.28%	

Discount and Discount% are now positive

52. We also need to ensure that the data is correct at the consolidated level. Re-orientate as below.

Rows:	Columns:	Context:		
Total of Products Products	Net revenue Measures Net revenue Measures	Total of Cities Cities	Discount% Net Revenue	Jan Months
	Actual Last Year	Actual Last Year-1	Variance	Comment
Total of Products	3.51%	4.45%	-0.94%	
Artful Artifacts	4.31%	6.68%	-2.36%	
Whacky Widgets	6.03%	5.27%	0.76%	
Thoughtful Things	5.02%	9.91%	-4.89%	
Potty Possessions	0.85%	2.50%	-1.65%	
Ominous Objects	2.35%	1.65%	0.70%	

If you see that the sign change is not being applied correctly. For example, for Artful Artifacts the discount going from down Actual Last Year-1 to Actual Last Year and this would be considered as favourable and should be displayed as a positive rather than a negative as it is here.

53. To ensure that the correct sign is being applied we should check the order of calculation and summarization. To do this right click the Variance column header, select **Calculate** and **Edit this Calculation**

54. The correct data will appear as per the screen shot below.

	Actual Last Year	Actual Last Year-1	Variance	Comment
Total of Products	3.51%	4.45%	0.94%	
Artful Artifacts	4.31%	6.68%	2.36%	
Whacky Widgets	6.03%	5.27%	-0.76%	
Thoughtful Things	5.02%	9.91%	4.89%	
Potty Possessions	0.85%	2.50%	1.65%	
Ominous Objects	2.35%	1.65%	-0.70%	

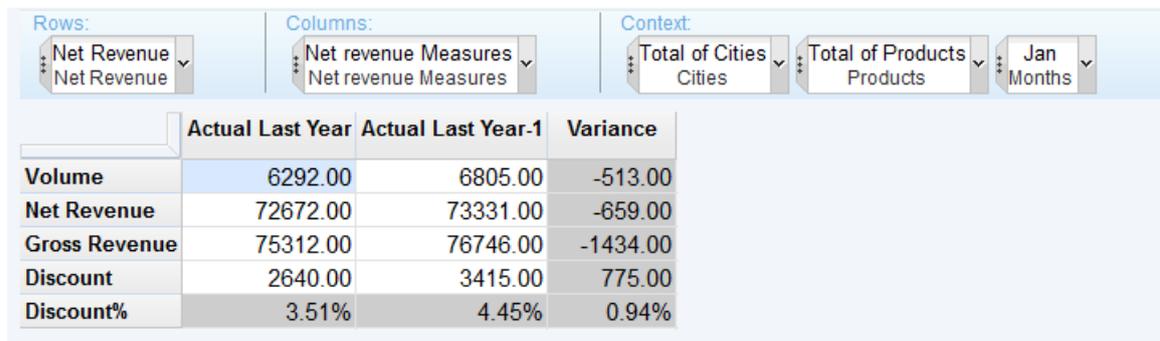
Presenting the data

For presentation we want to create a more meaningful workspace.

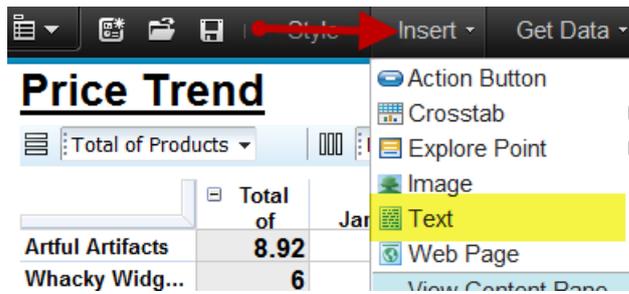
55. Add a second widget with the Revenue Cube to the Discount Analysis tab. Arrange and orientate as per Screen Shot below. Hide the Total of Cities and the Comment.



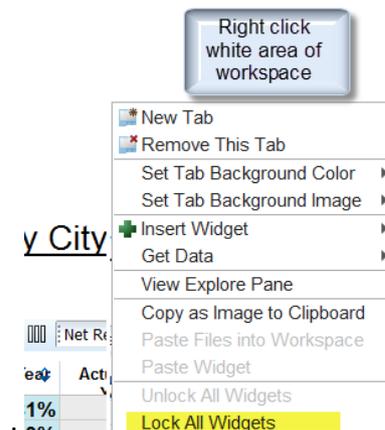
56. Add a fourth widget to show the Discount Summary as per screen shot below.



57. Add text boxes for the widget headings. Do this either by selecting **Insert** from the menu on the top menu bar and then **Text** or use the **shortcut** of double clicking the canvas which invokes this function and then you can type straight into the box. Type in the names as per screen shot, enlarge, embolden and underline the text to make it stand out.

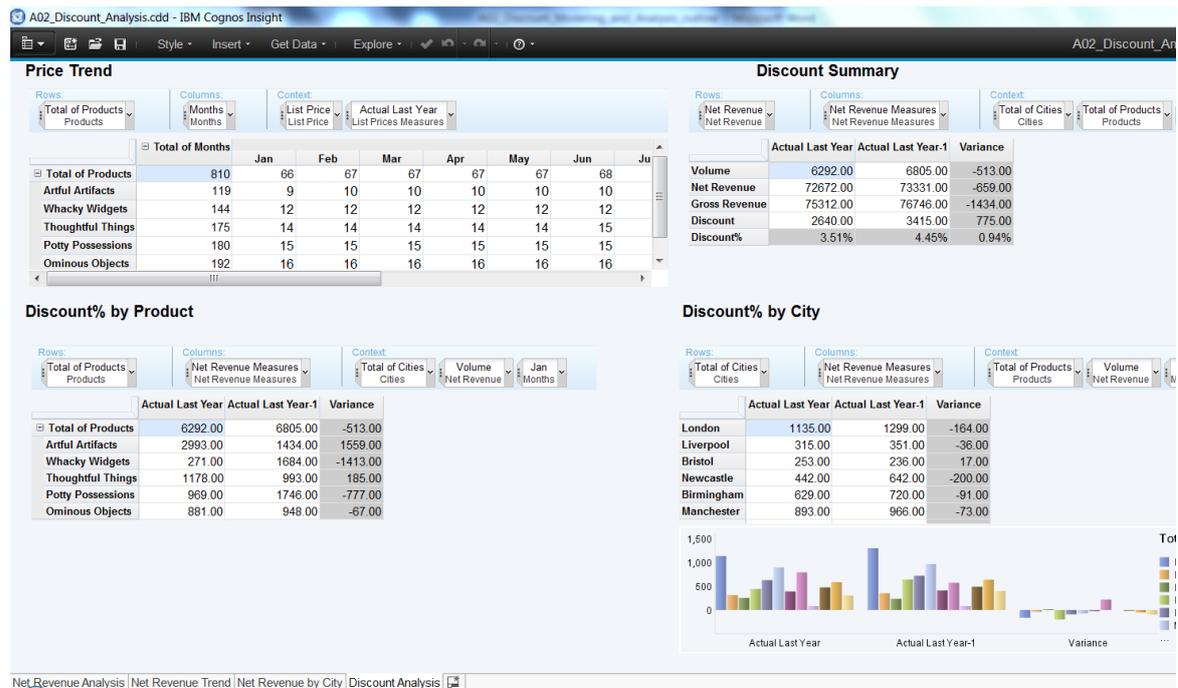


58. Once the positioning and titles are complete, right click in the white area of the workspace and select Lock All Widgets to fix the workspace



59. **Save** the workspace again and close Cognos Insight

Finished Workspace



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