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Data warehousing and Business Intelligence

Assignment two

2018

Submitted by:

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1. Data Source used to create cubes and Reports

I created a Data warehouse (MySourceDB_DW) in the Assignment one and MySourceDB_DW is the data source used to create and deploy the cubes in this Assignment two.

When creating OLAP cubes and to the Excel work sheets and to SSRS reports MySourceDB_DW Data Warehouse is used as the Data source.

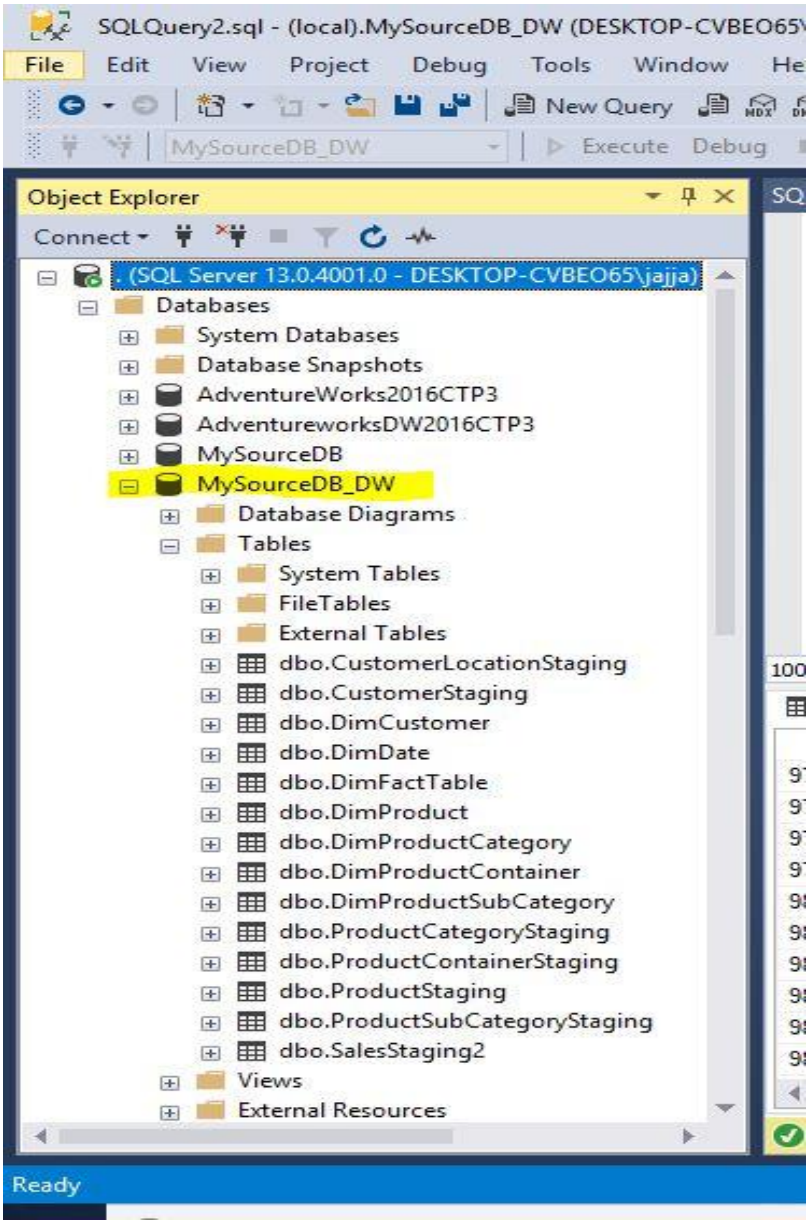

Figure 1.0

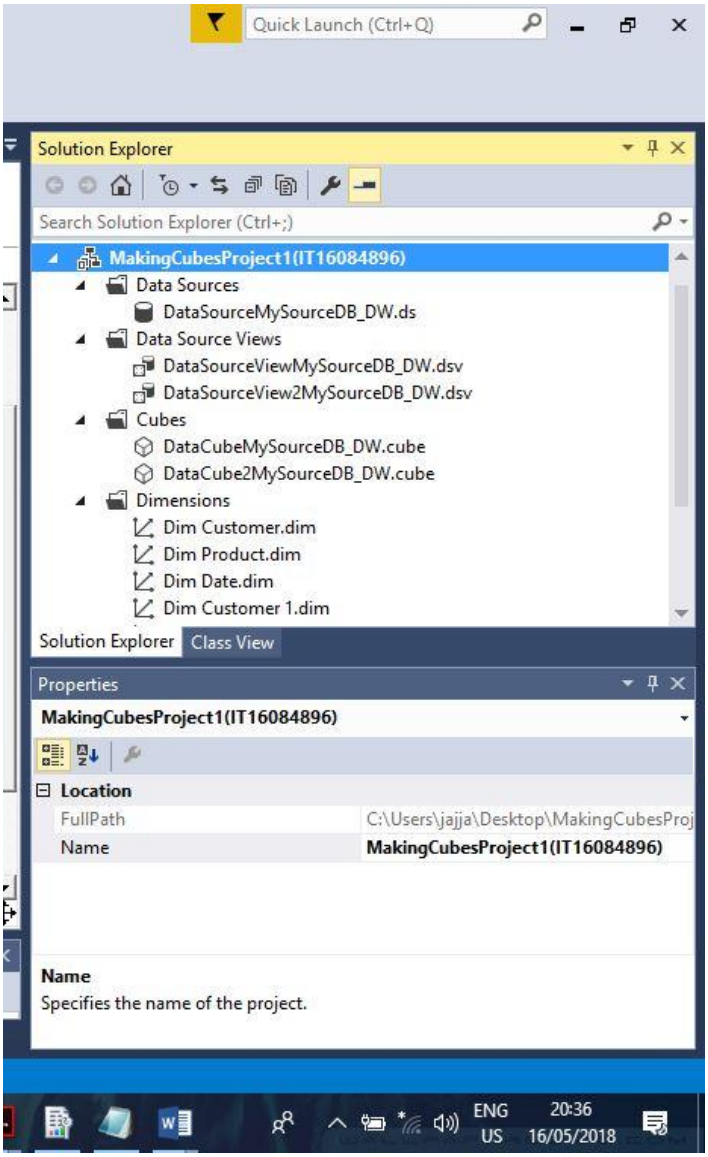

Figure 1.1

As shown in the Figure 1.1 I have open a new project in Analysis Services Multidimensional and Data Mining project in SSAS (SSDT).

As the first step I have created my data source. (DataSourceMySourceDB_DW.ds)

Then the Data source view and the OLAP cubes needed for the reports to analyse the data.

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2. Hierarchy in the OLAP cube

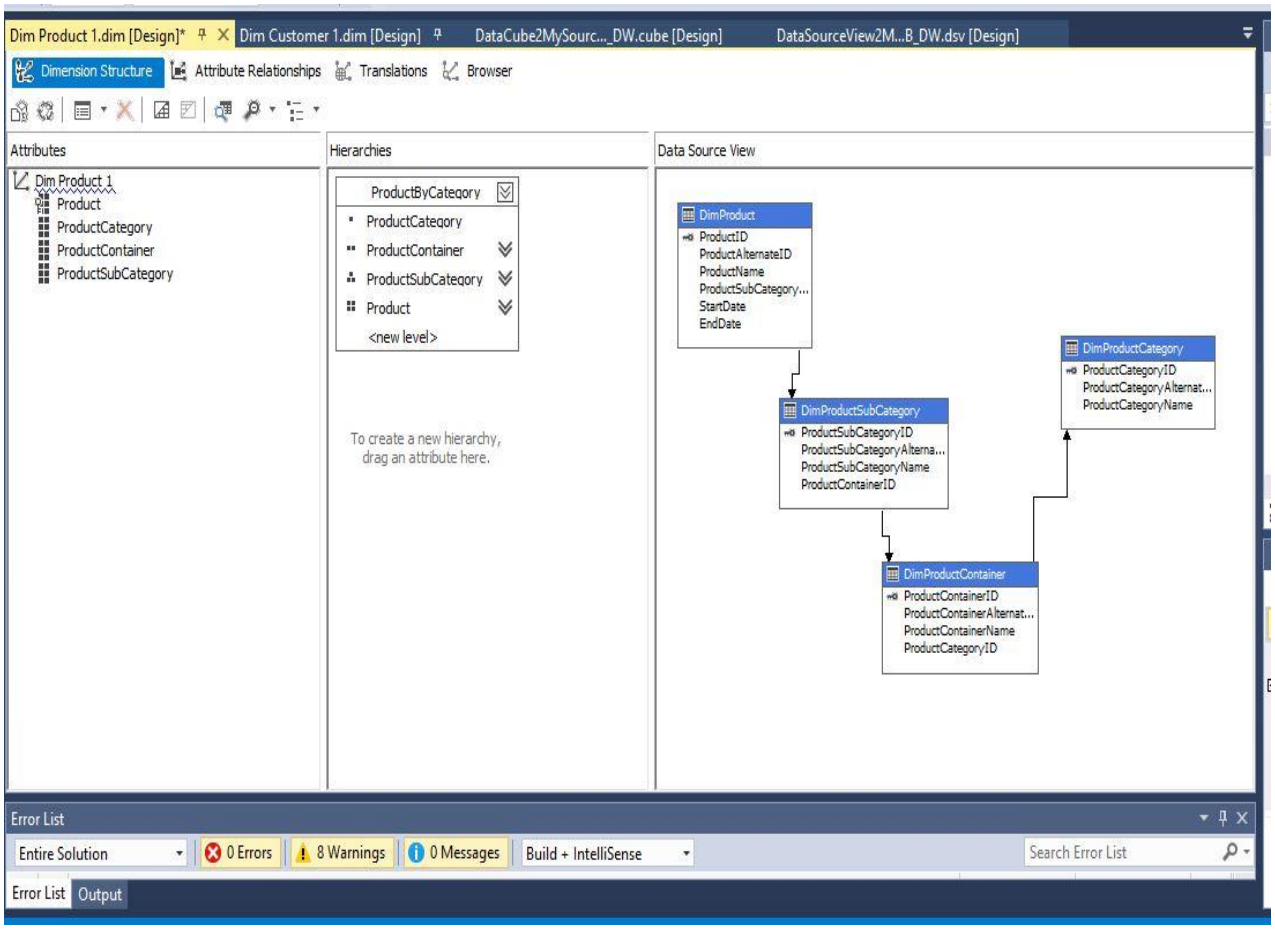

Figure 1.2

As shown in the Figure 1.2 I have created a hierarchy in the cube.

If I browse the created hierarchy as shown in the below Figure 1.3 results are shown.

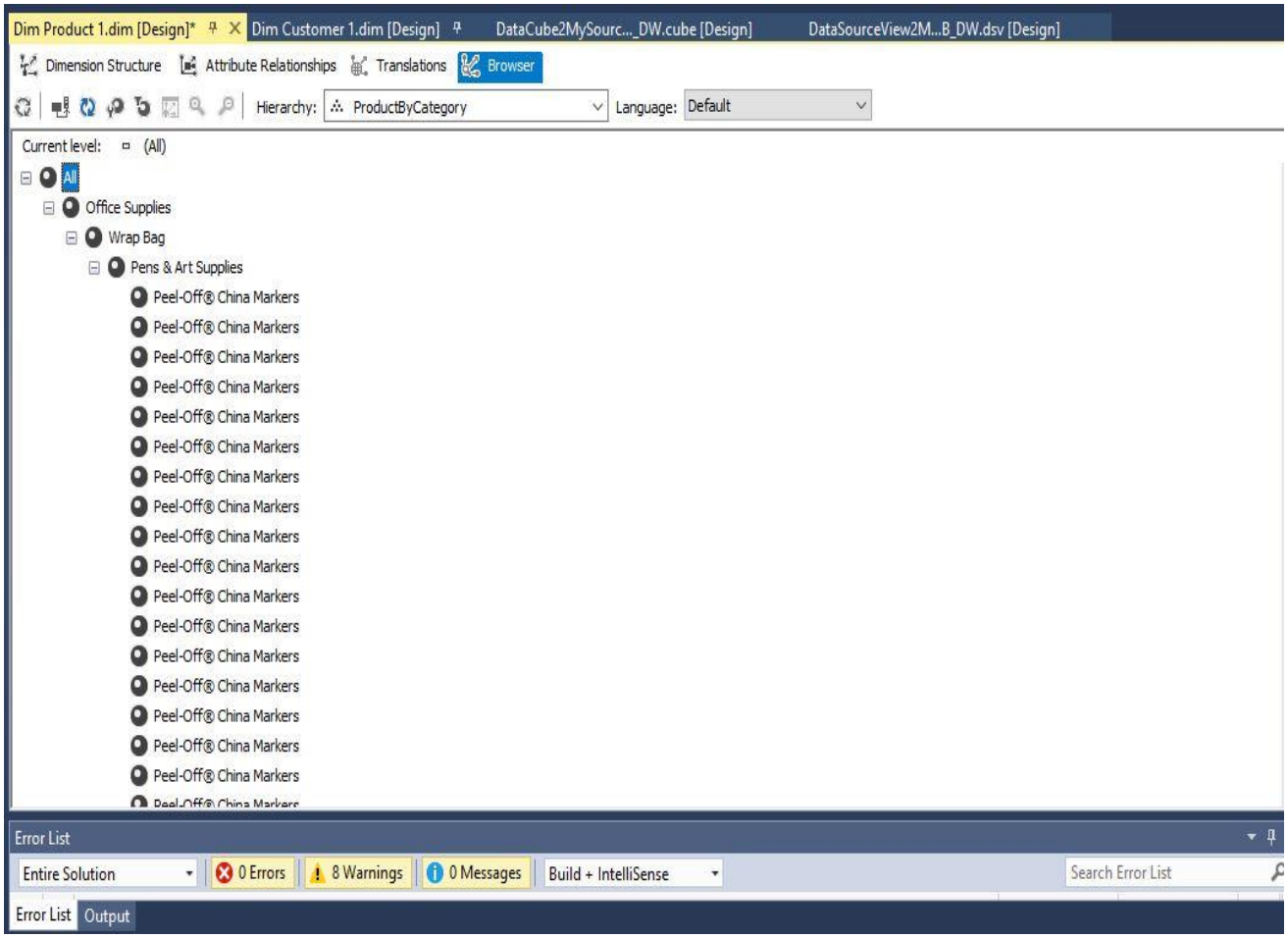

Figure 1.3

This hierarchy is a natural hierarchy which one child has only a one parent in the hierarchy.

3. Demonstration of OLAP operations using the Excel work book

Using the Power pivot, Power Query, Power view in excel allow us to create a semantic layer inside excel.

To connect the excel work book and to get the data to the semantic layer we use MDX query.

a) Roll up and Drill down

Climbing up a hierarchy of a dimension to aggregate data means the Roll up OLAP operation in cubes.

Stepping down a hierarchy of a dimension allowing navigation through details means the Drill down OLAP operation in cubes.

Below figure 1.4 Figure 1.5 and the Figure 1.6 shows the created Excel sheet reports to demonstrate the roll up and the drill down OLAP operations.

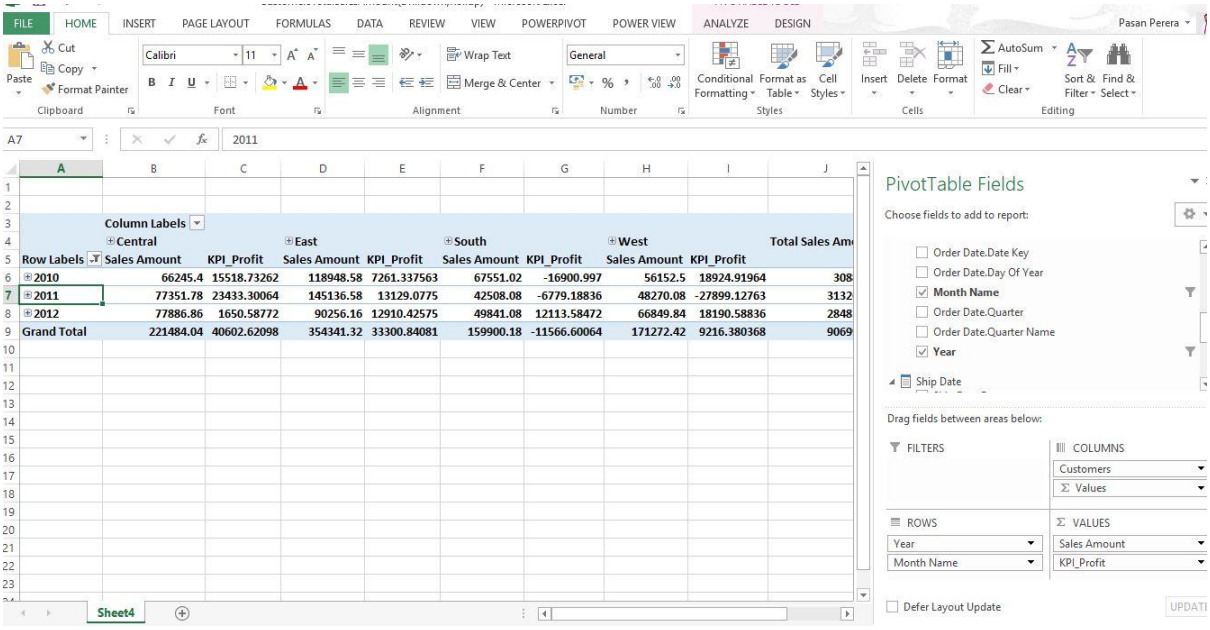

Figure 1.4

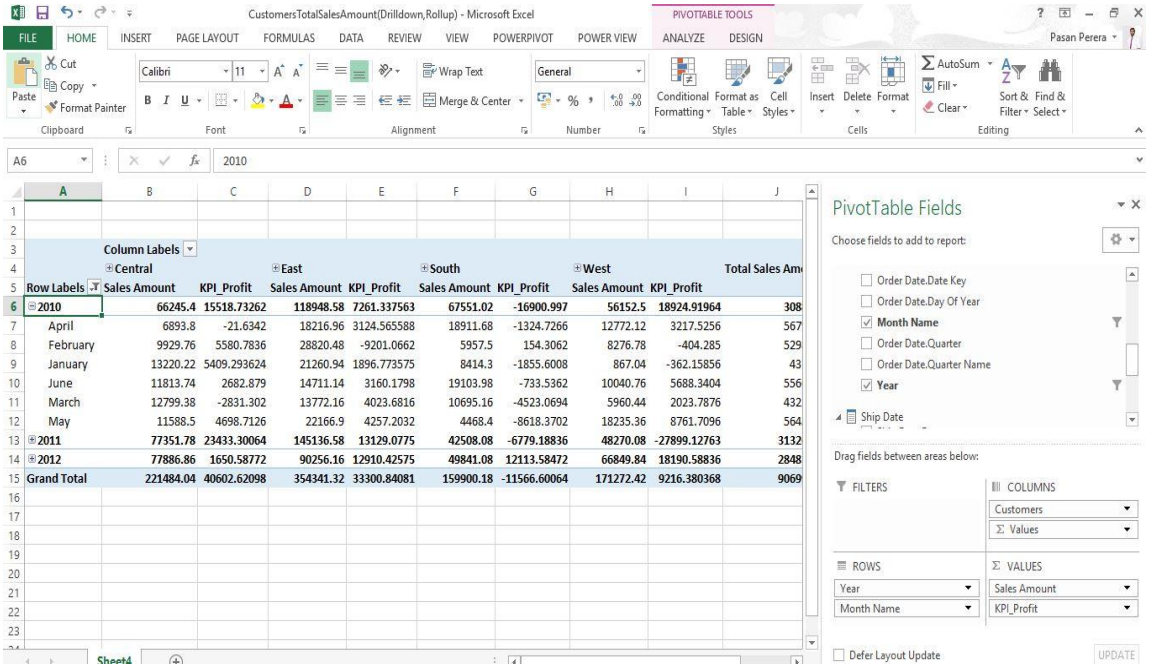

Figure 1.5

In this excel sheet it shows the total sales amount and the total profit using the KPI value of the customers.
In the columns I have included a hierarchy (Region-->State/Province-->City-->Customers) which is a un-natural hierarchy in this case so I can view the report details region wise state wise city wise customer details.

For my row also from year we can drill down to months so we can view the monthly sales amount and the profit details.
Again we can roll up from months to years so we can view the yearly sales amount and the profit.

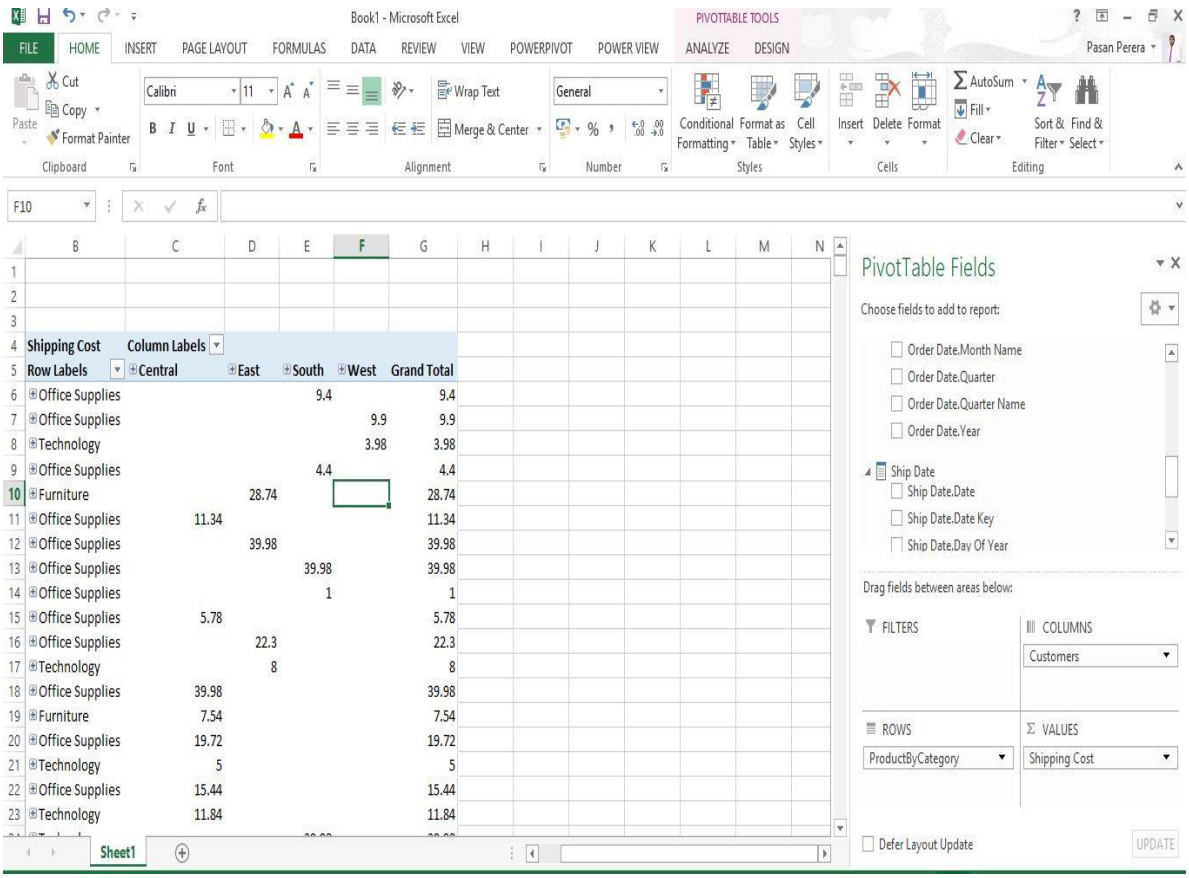

Figure 1.6

In this report we can drill down through ProductCategory to ProductContainer and from ProductContainer to ProductSubCategory and finally from ProductSubCategory to the Product.

Likewise from Product again we can roll up till ProductCategory.

So this will report will give us the Product wise details of total shipping costs of each customer relevant to the each Region, State/Province and the City.

b) Slice

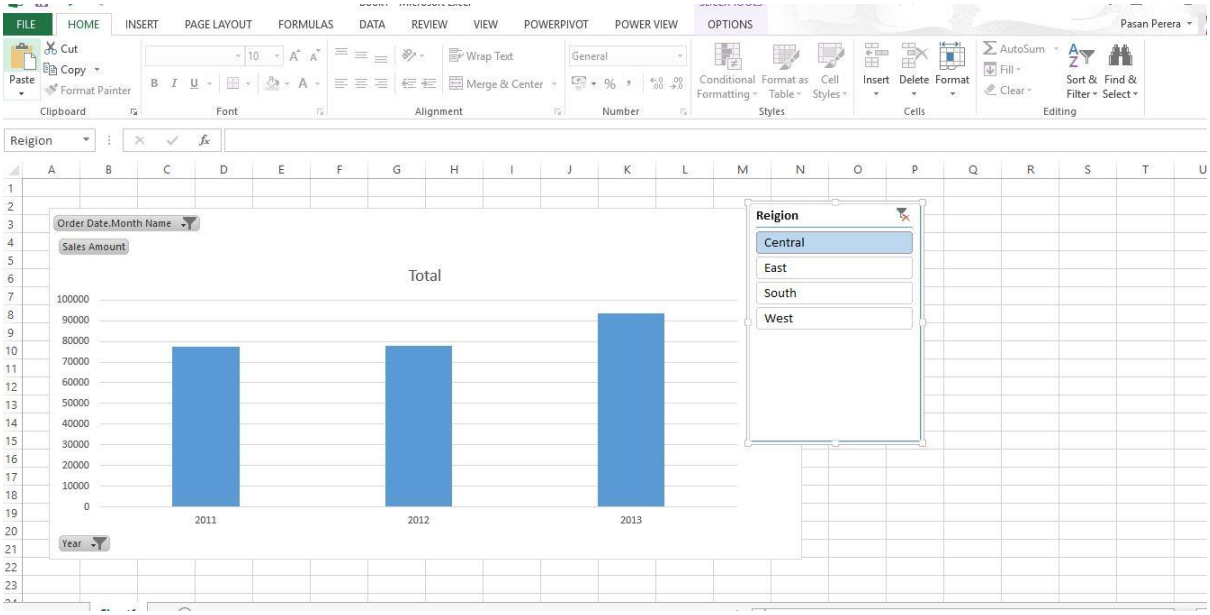

Figure 1.7

This report displays us the total sales for three years and slice by the region.
Another report to demonstrate the slice OLAP operation,

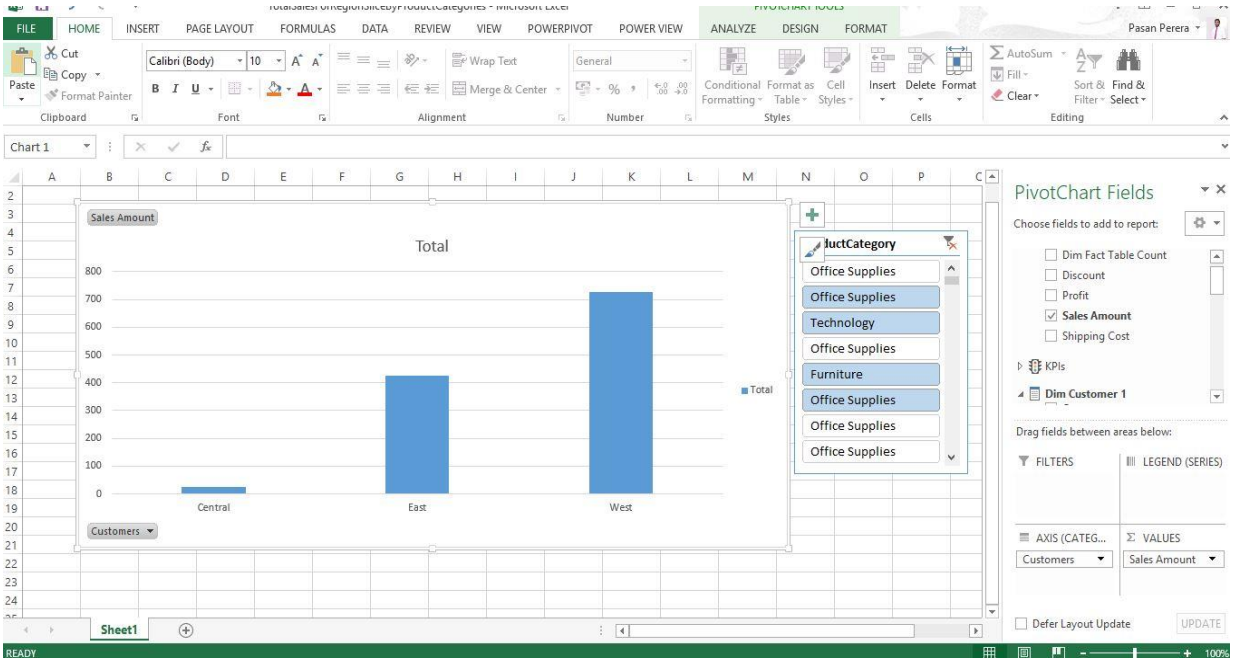

Figure 1.8

This report displays the total sales amount for three regions slice by Product Categories

c) Dice

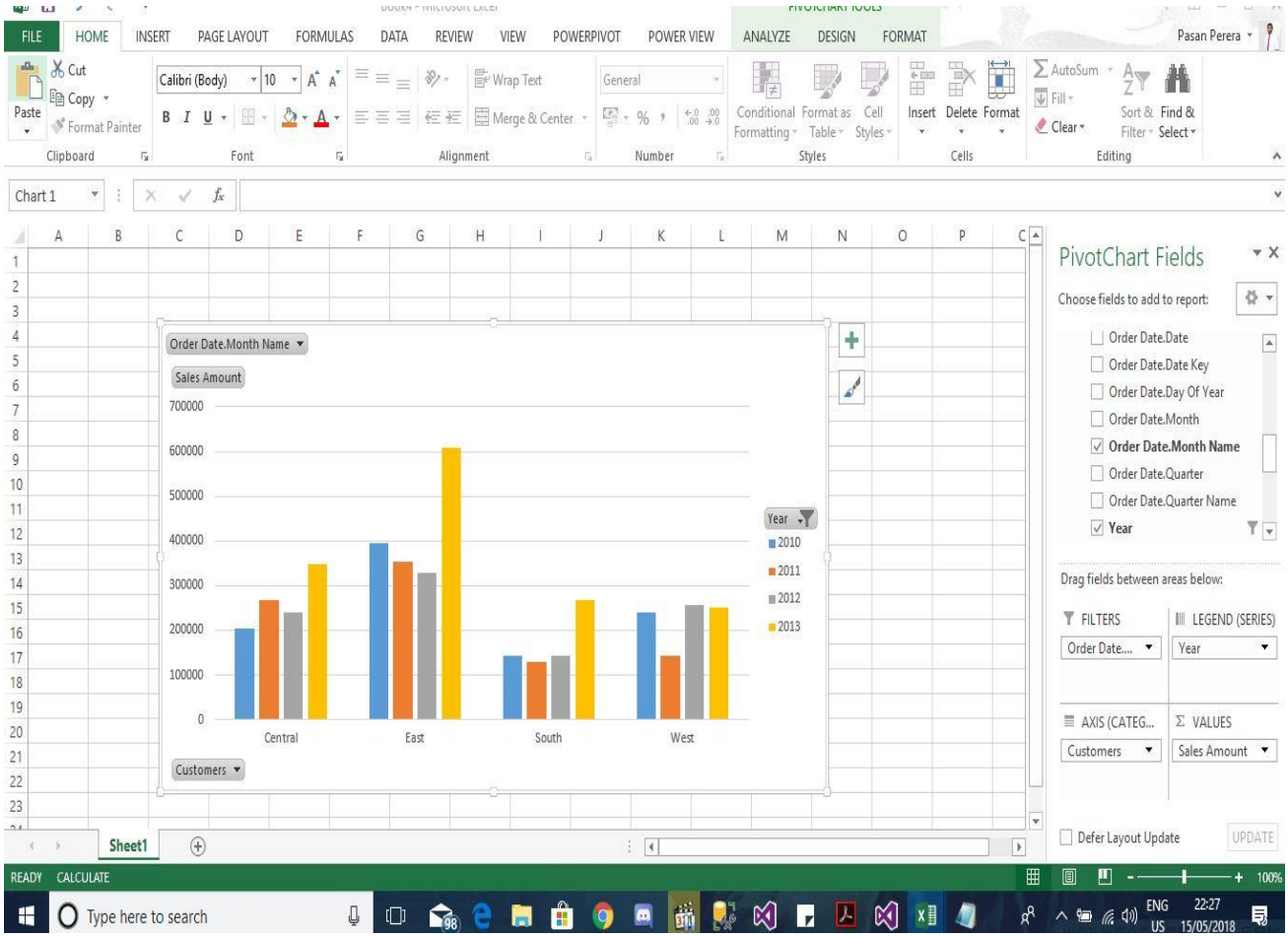

Figure 1.9

d) Pivot

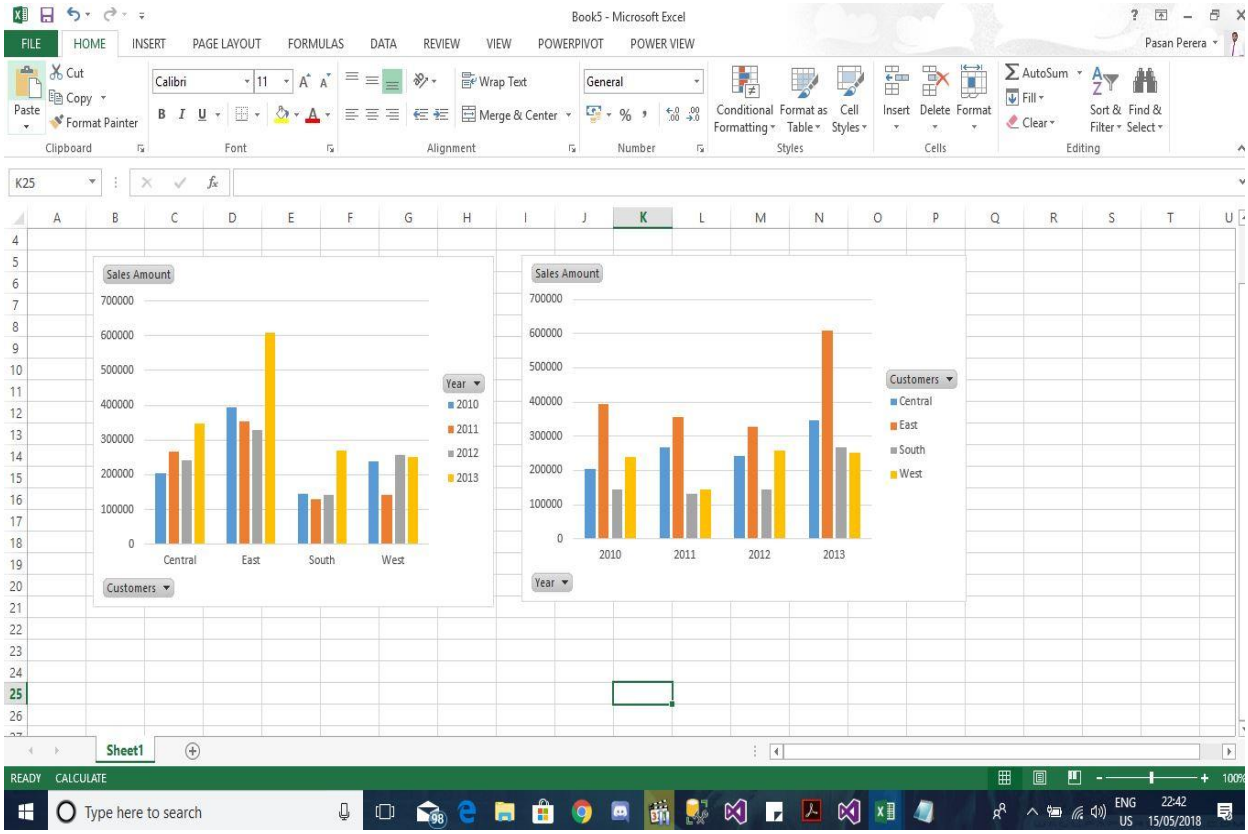

Figure 2.0

4. SSRS Reports using the Report builder

SSRS is a platform creating, publishing, managing reports/dashboards. Then we can deliver them to the right users in different ways like email, via a web browser, mobile device etc.

- SSRS components
  - Report server
  - SSRS web portal
  - Report Server Configuration Manager
  - Report Server database

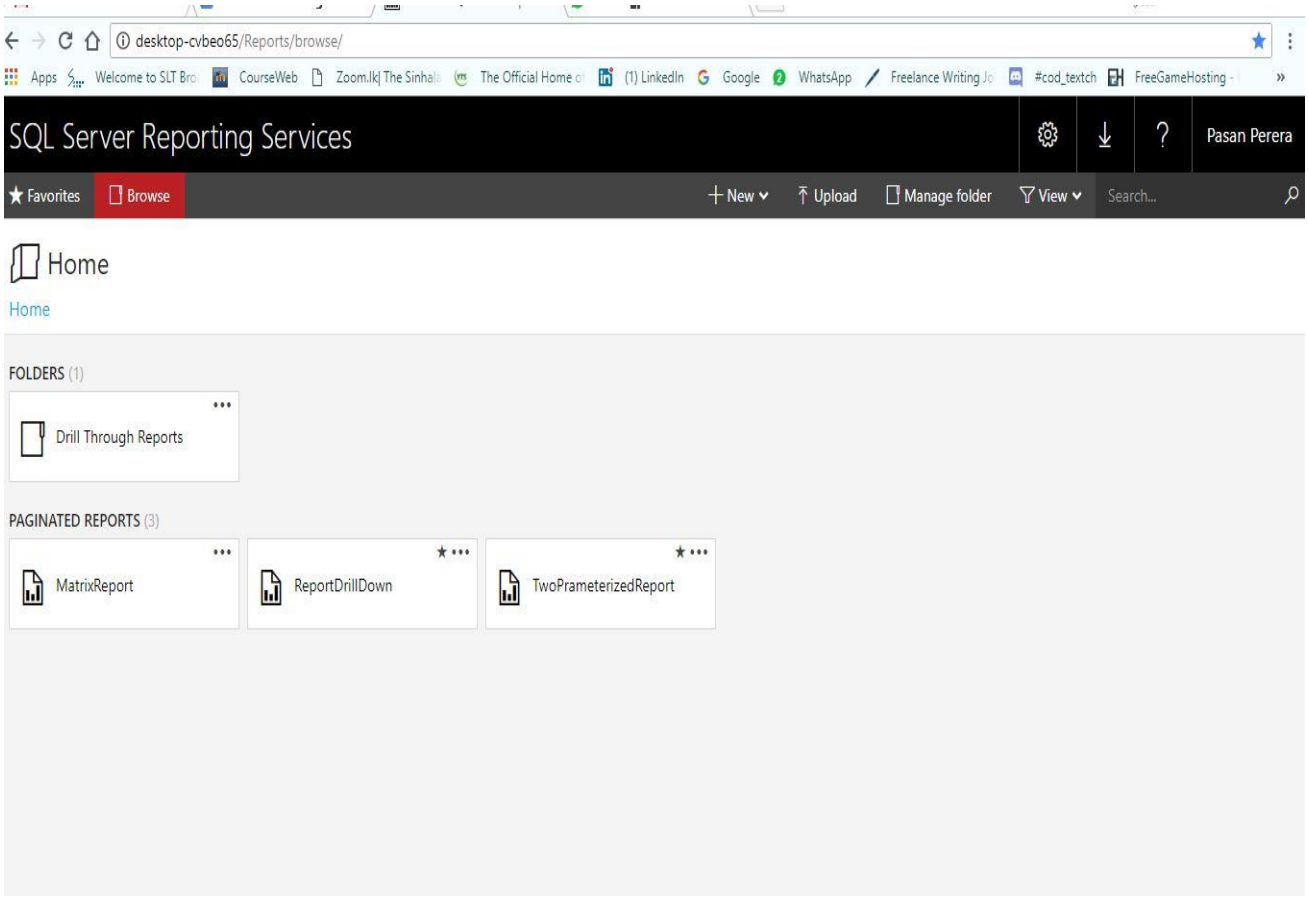

Figure 2.1

Figure 2.1 shows the web portal where the SSRS reports are saved.

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To get the data to the report builder to analyse the data the below query is used to obtain the data,

```
select dp.ProductName, dsc.ProductSubCategoryName,
dpcon.ProductContainerName, dpc.ProductCategoryName,

 dc.CustomerAlternateID, dc.CustomerName, dc.Reigion, dc.StateProvince,
dc.City,

 dd.Month, dd.MonthName, dd.Year,

 ft.Profit, ft.SalesAmount, ft.Discount, ft.ShippingCost

from dbo.DimFactTable ft inner join dbo.DimProduct dp on ft.ProductID =
dp.ProductID

inner join dbo.DimProductSubCategory dsc on dp.ProductSubCategoryID =
dsc.ProductSubCategoryID

 inner join dbo.DimProductContainer dpcon on dsc.ProductContainerID =
dpcon.ProductContainerID

inner join dbo.DimProductCategory dpc on dpcon.ProductCategoryID =
dpc.ProductCategoryID

 inner join dbo.DimCustomer dc on ft.CustomerID = dc.CustomerID

  inner join dbo.DimDate dd on ft.OrderDate = dd.DateKey
```

- SSRS report types
  - Paginated reports
  - Mobile reports
  - KPIs

a) Report 1: Report with a matrix

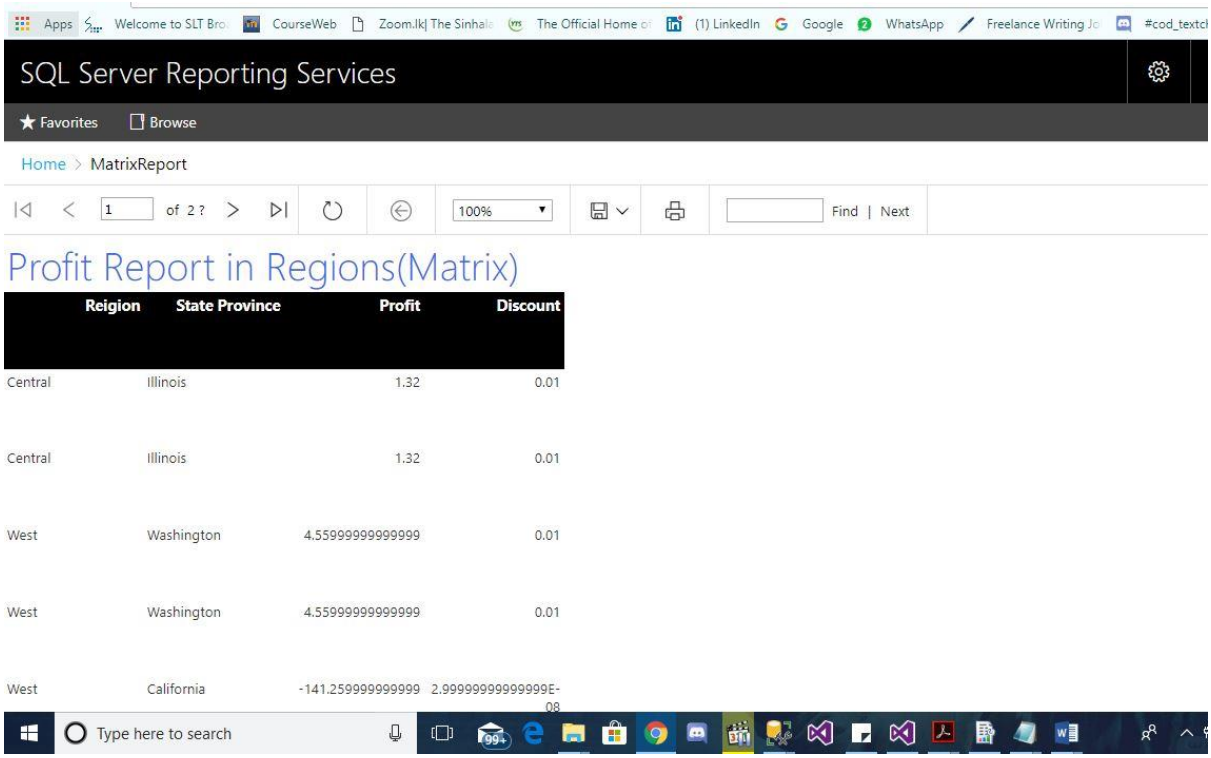


Figure 2.2

b) Report with two parameters with list of values and selection of the value of first parameter, will change the list of available values in the second parameter.

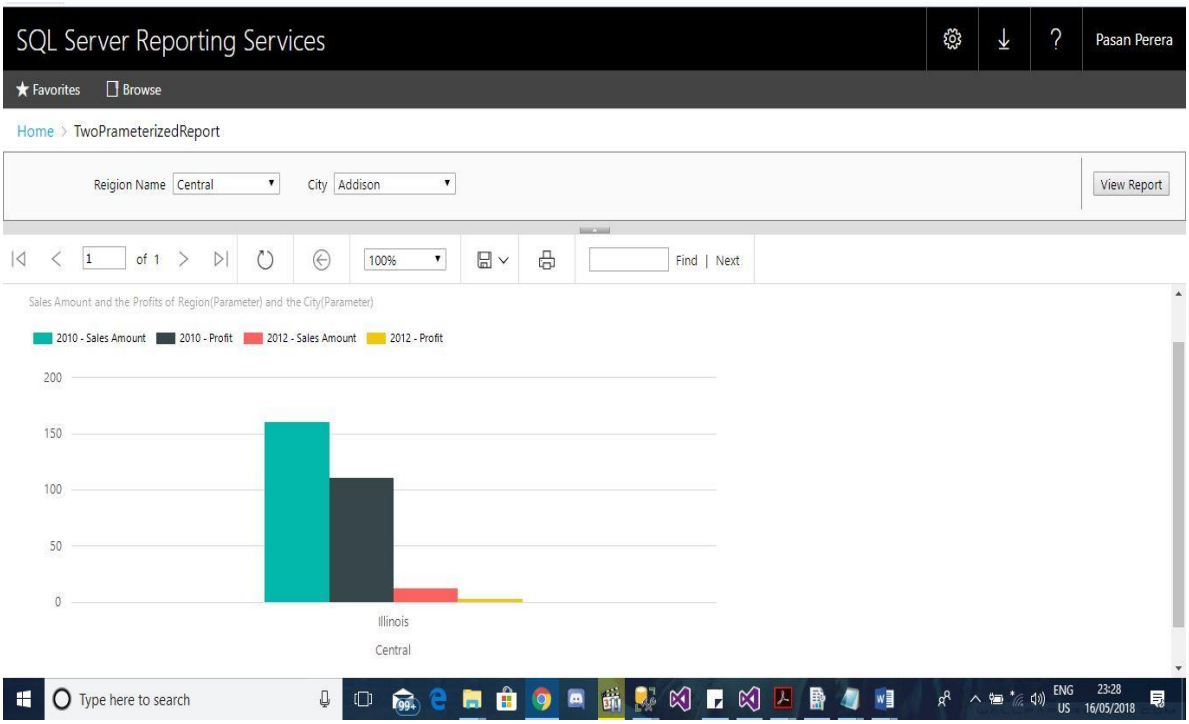
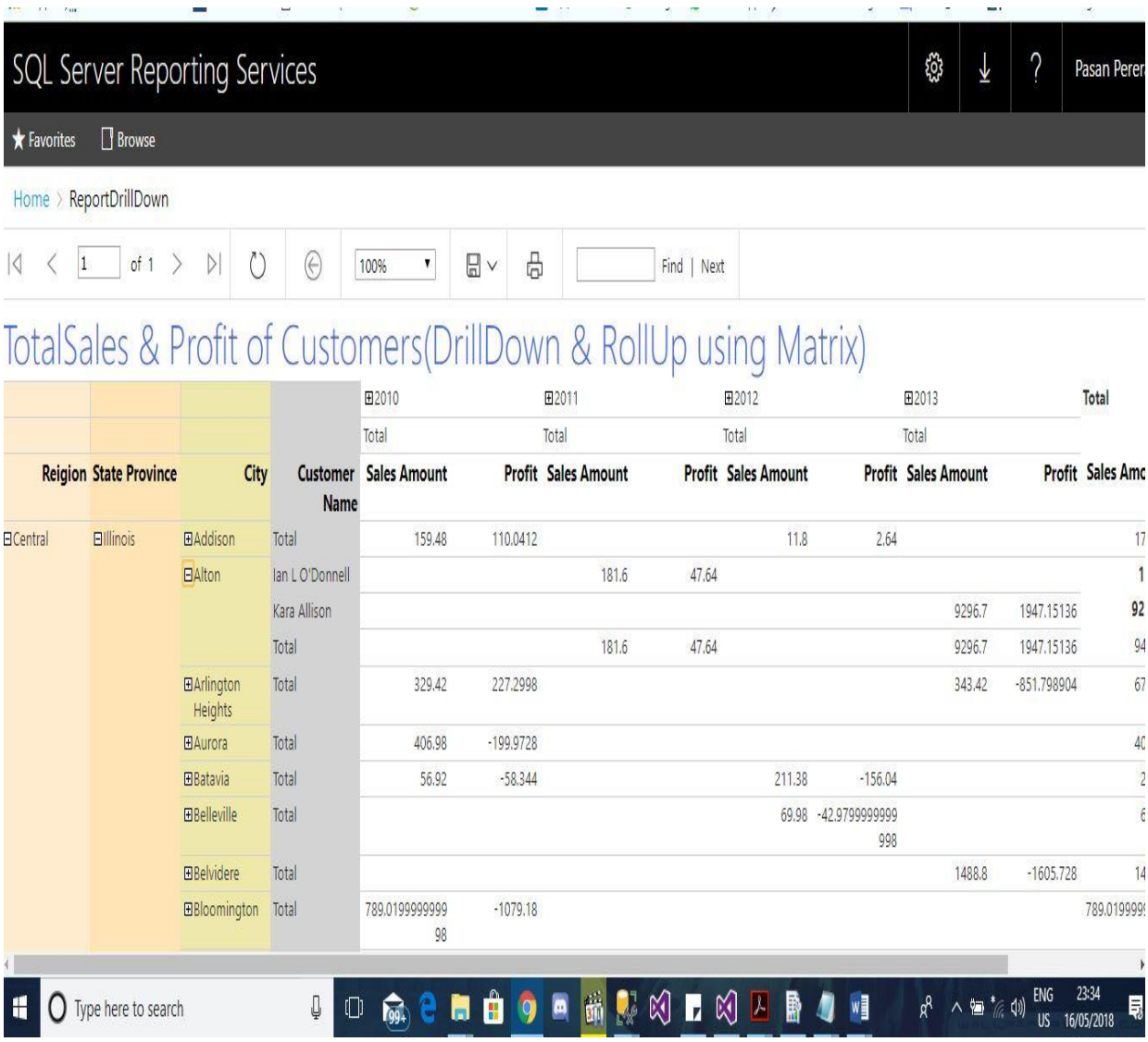


Figure 2.3

```
select City
from dbo.DimCustomer
where Reigion = @ReigionName
```

I have used this query so that when you select the first parameter (Region) cities are selected which is relevant to that particular region, Because of that selection of the value of first parameter, will change the list of available values in the second parameter.

c) SSRS drill-down report.



				⊞2010		⊞2011		⊞2012		⊞2013		Total
				Total		Total		Total		Total		
Reigion	State Province	City	Customer Name	Sales Amount	Profit	Sales Amount	Profit	Sales Amount	Profit	Sales Amount	Profit	Sales Amc
⊟Central	⊟Illinois	⊞Addison	Total	159.48	110.0412			11.8	2.64			17
		⊟Alton	Ian L O'Donnell			181.6	47.64					1
			Kara Allison							9296.7	1947.15136	92
			Total			181.6	47.64			9296.7	1947.15136	94
		⊞Arlington Heights	Total	329.42	227.2998					343.42	-851.798904	67
		⊞Aurora	Total	406.98	-199.9728							40
		⊞Batavia	Total	56.92	-58.344			211.38	-156.04			2
		⊞Belleville	Total					69.98	-42.9799999999998			6
		⊞Belvidere	Total							1488.8	-1605.728	14
		⊞Bloomington	Total	789.019999999998	-1079.18							789.019999

Figure 2.4

d) SSRS drill-through report

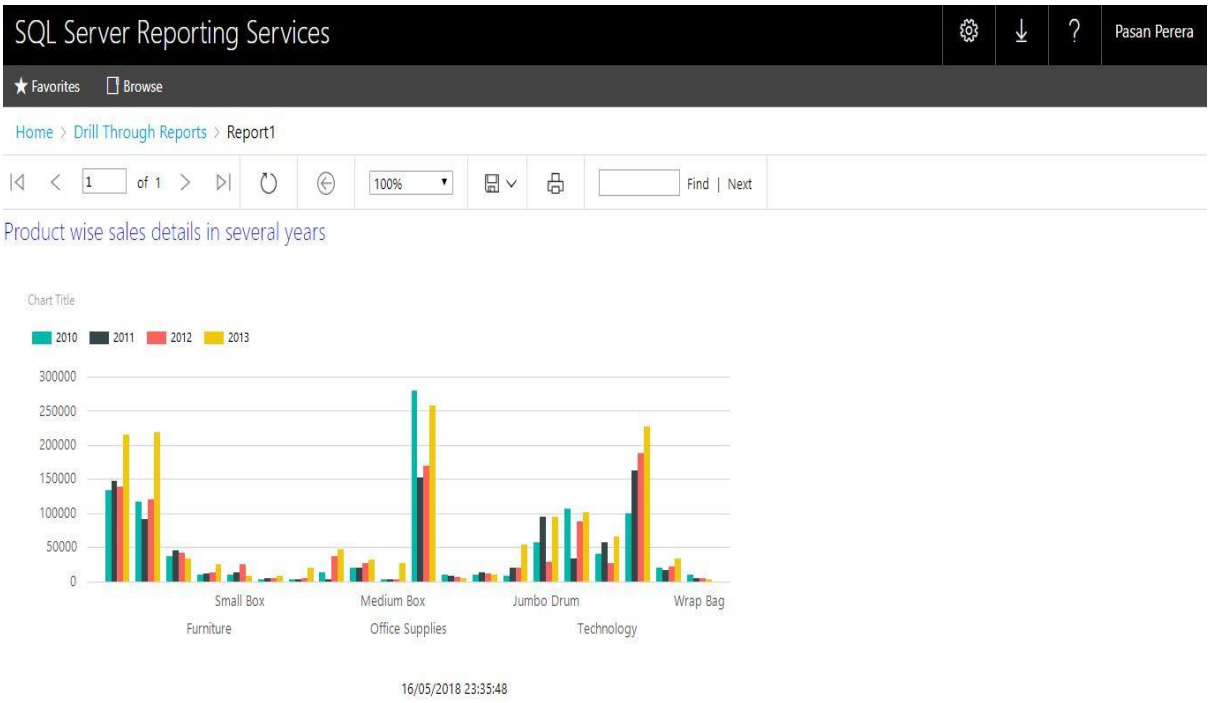


Figure 2.5

When you click on the bar you can drill through to the other report as shown in the below Figure 2.6.

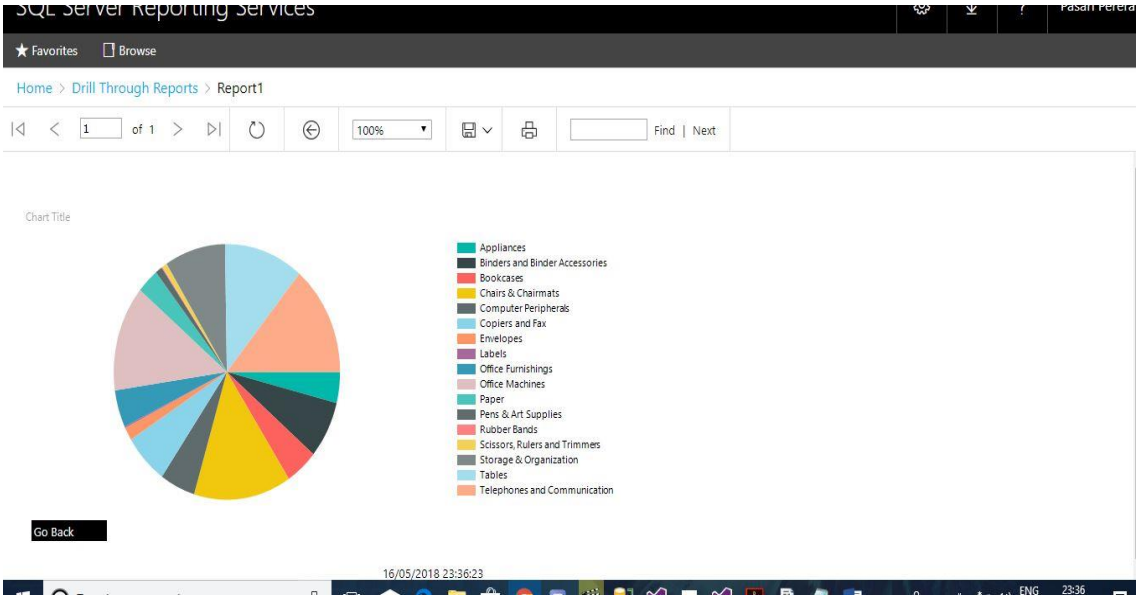


Figure 2.6

When you click go back you can go to the previous report which is shown in the above Figure 2.5.

References

- Practical 6 and Practical 7.
- https://www.mbaskool.com/business-concepts/it-and-systems/13503-slicing-and-dicing.html