



# PowerBI - DAX

---

DR.PASIDTH THANACHOTANANKUL

SEPTEMBER 24<sup>TH</sup> 2021

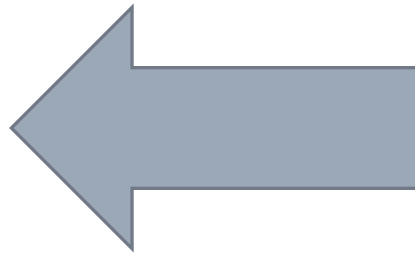
SESSION 2

## DAX Functions:

- DateTime
- Filter
- Info
- Logical
- Mathtrig
- ParentChild
- Statistical
- Text

**DAX** คือ การใช้สูตรในการคำนวณข้อมูล เพื่อนำมาใช้ในการวิเคราะห์ข้อมูล

**DAX** สามารถแบ่งออกได้ 8 กลุ่ม ได้แก่



# Components of a DAX Data Model

The DAX data modeling engine is made up of six key components.

**DATA** -> ข้อมูลที่จะนำมาวิเคราะห์

**TABLE** -> เป็นที่เก็บข้อมูล และค่าคำนวณของ DAX

**Columns** -> ช่องสำหรับเก็บข้อมูล ในตารางข้อมูล ข้อมูลจะถูกโหลดเข้ามาในโปรแกรม  
ไม่สามารถแก้ไขได้ เรียกอีกชื่อว่า **Fields**

**Relationships** -> เป็นการแสดงความสัมพันธ์ของ 2 ตารางเข้าด้วยกัน สามารถใช้ได้ 2  
กรณีคือ **One – Many** และ **One – One**.

**Measures** -> คือผลลัพธ์จากการคำนวณด้วยสูตรต่าง ๆ สามารถนำไปแสดงใน  
รูปภาพ หรือนำไปคำนวณต่อในสูตรต่าง ๆ ได้ ทุกครั้งที่มีการอัปเดตข้อมูล หรือ ทำ **Slicer**  
ผลคำนวณจะเปลี่ยนตาม

**Hierarchies** -> คือกลุ่มของข้อมูลที่สามารถแตกย่อยลงไปได้อีก เช่น วันที่ แยก เป็น ปี  
ไตรมาส เดือน เป็นต้น

**DAX** มี องค์ประกอบ 6 ชนิด ในการ  
สร้างสูตรคำนวณ หรือ การนำข้อมูล  
ไปทำการวิเคราะห์

# Exercise 2

---

P6-SUPERSTOREUS-2015.XLSX

[github.com/DrPasidth/powerBI](https://github.com/DrPasidth/powerBI)

# 1. Get Data : P6-SuperStoreUS-2015.xlsx

File

Home

Help

Table tools

Name

Orders

Mark as date table

Calendars

Manage relationships

Relationships

New measure

Calculations

Quick measure

Calculations

New column

Calculations

New table

Calculations

Structure

Row ID	Order Priority	Discount	Unit Price	Shipping Cost	Customer ID	Customer Name	Ship Mode	Customer Segment	Product Category	Product Sub-Category	Prod
24844	Medium	0.09	78.69	19.99	14	Gwendolyn F Tyson	Regular Air	Small Business	Furniture	Office Furnishings	Sr
25933	High	0	99.99	19.99	43	Theodore Moran	Regular Air	Consumer	Technology	Office Machines	Sr
23880	High	0.08	896.99	19.99	84	Helen Stein	Regular Air	Corporate	Office Supplies	Binders and Binder Accessories	Sr
24663	Low	0.05	161.55	19.99	87	Norman Shields	Regular Air	Corporate	Office Supplies	Storage & Organization	Sr
5361	Critical	0.02	49.99	19.99	181	Wesley Waller	Regular Air	Small Business	Technology	Computer Peripherals	Sr
23361	Critical	0.02	49.99	19.99	184	Phillip Holmes	Regular Air	Small Business	Technology	Computer Peripherals	Sr
25158	Critical	0	161.55	19.99	197	Samantha Weaver	Regular Air	Small Business	Office Supplies	Storage & Organization	Sr
7158	Critical	0	161.55	19.99	198	Leroy Blanchard	Regular Air	Small Business	Office Supplies	Storage & Organization	Sr
23153	Not Specified	0.03	48.04	19.99	445	Judy Barrett	Regular Air	Small Business	Office Supplies	Paper	Sr
18467	Low	0.07	165.2	19.99	463	Debbie Stevenson	Regular Air	Small Business	Office Supplies	Storage & Organization	Sr
21517	Not Specified	0.03	1270.99	19.99	524	Gina McKnight	Regular Air	Consumer	Office Supplies	Binders and Binder Accessories	Sr
18664	Medium	0.03	162.93	19.99	578	Evan K Bullard	Regular Air	Corporate	Office Supplies	Envelopes	Sr
19781	Critical	0.08	30.53	19.99	592	Eva Silverman	Regular Air	Small Business	Office Supplies	Labels	Sr
21718	Medium	0.02	419.19	19.99	627	Scott McKenna	Regular Air	Corporate	Office Supplies	Storage & Organization	Sr
24869	Low	0.03	51.75	19.99	646	Robin High	Regular Air	Corporate	Furniture	Office Furnishings	Sr

Fields

Search

Orders

Returns

Users

## 2. Create New Measure:

```
TotalSales = CALCULATE(SUM(Orders[Sales]))
```

```
AvgProfit = AVERAGE(Orders[Profit])
```

```
AvgProfitSmallBiz = CALCULATE(AVERAGE(Orders[Profit]),Orders[Customer Segment]="Small Business")
```

```
AvgProfitHomeOffice = CALCULATE(AVERAGE(Orders[Profit]),Orders[Customer Segment]="Home Office")
```

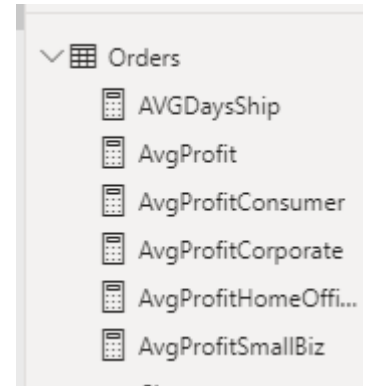
```
AvgProfitCorporate = CALCULATE(AVERAGE(Orders[Profit]),Orders[Customer Segment]="Corporate")
```

```
AvgProfitConsumer = CALCULATE(AVERAGE(Orders[Profit]),Orders[Customer Segment]="Consumer")
```

## 3. Create New Column

```
Days2Ship = DATEDIFF(Orders[Order Date],Orders[Ship Date],DAY)
```

```
SalesPct = DIVIDE(Orders[Sales],SUMX(ALL(Orders[Sales]),Orders[Sales]))
```



Region ▾	State or Province ▾	City ▾	Postal Code ▾	Order Date ▾	Ship Date ▾	Profit ▾	Quantity ordered new ▾	Sales ▾	Order ID ▾	SalesPct ▾	Days2Ship ▾
Central	Minnesota	Prior Lake	55372	5/12/2015	Thursday, May 14, 2015	803.4705	16	1164.45	86838	0.06%	2
West	Washington	Redmond	98052	5/10/2015	Monday, May 11, 2015	25.91382	6	647.07	91454	0.03%	1
East	Ohio	Cincinnati	45231	3/30/2015	Thursday, April 2, 2015	7402.32	13	10728	87356	0.56%	3
West	California	Vacaville	95687	6/3/2015	Monday, June 8, 2015	1892.424	19	3127.69	90596	0.16%	5
West	California	San Francisco	94122	2/21/2015	Saturday, February 21, 2015	-76.89	18	901.81	38087	0.05%	0
East	Massachusetts	Arlington	2474	2/21/2015	Saturday, February 21, 2015	-76.89	5	250.5	88360	0.01%	0
Central	Kansas	Overland Park	66212	4/2/2015	Saturday, April 4, 2015	1167.158	19	3108.98	88921	0.16%	2
Central	Michigan	Detroit	48138	4/2/2015	Saturday, April 4, 2015	1014.92	77	12599.55	51072	0.66%	2
Central	Nebraska	Norfolk	68701	4/11/2015	Monday, April 13, 2015	-4.459999999999999	2	101.71	88083	0.01%	2
West	California	West Hollywood	90069	1/14/2015	Friday, January 16, 2015	521.69	7	1081.54	88061	0.06%	2
South	Tennessee	Farragut	37922	1/20/2015	Thursday, January 22, 2015	363.552	2	2589.01	91127	0.13%	2
East	Connecticut	Naugatuck	6770	5/13/2015	Thursday, May 14, 2015	293.14	3	515.88	88644	0.03%	1
Central	Illinois	Wilmette	60091	1/17/2015	Saturday, January 17, 2015	-239.8656	10	285.87	86307	0.01%	0
East	Ohio	Cincinnati	45231	4/21/2015	Wednesday, April 23, 2015	6618.3	23	3538	88450	0.58%	4



Matrix: Rows-Product Category | Columns->Order Date (Month) | Values -> TotalSales

Product Category	มกราคม	กุมภาพันธ์	มีนาคม	เมษายน	พฤษภาคม	มิถุนายน	Total
Furniture	87,567	125,695	88,443	117,546	112,352	129,101	660,704
Office Supplies	68,994	42,257	68,020	181,592	110,339	80,168	551,369
Technology	118,206	158,150	115,234	90,694	83,882	146,100	712,265
Total	274,767	326,101	271,697	389,832	306,572	355,369	1,924,338

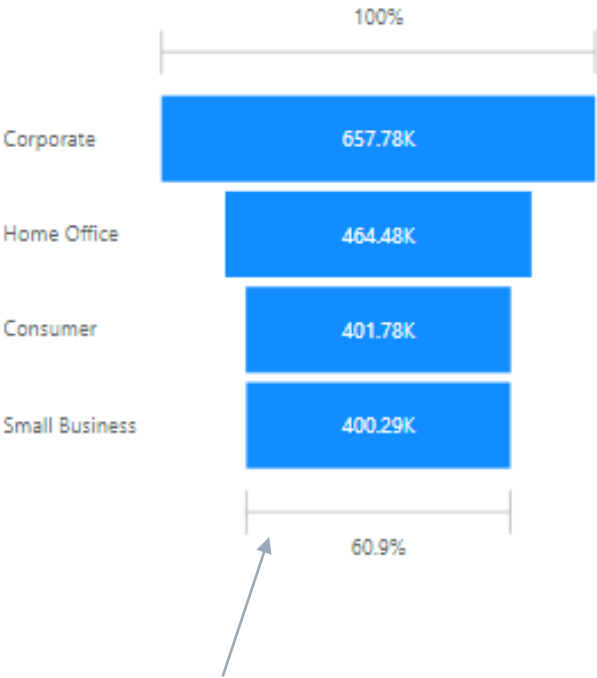
Total Sales

1.92M

TotalSales

Card: Fields -> TotalSales

TotalSales by Customer Segment



City	Aberdeen		Abilene		Addison		Adrian		Agawam	
Product Category	TotalSales	SalesPct	TotalSales	SalesPct	TotalSales	SalesPct	TotalSales	SalesPct	TotalSales	Sale
Furniture							1,029.96	0.05%		
Bookcases										
Chairs & Chairmats										
Office Furnishings							1,029.96	0.05%		
Tables										
Office Supplies	40.69	0.00%	53.30	0.00%	79.74	0.00%				
Appliances	40.69	0.00%	53.30	0.00%						
Binders and Binder Accessories										
Envelopes										
Labels					79.74	0.00%				
Paper										
Pens & Art Supplies										
Rubber Bands										
Scissors, Rulers and Trimmers										
Storage & Organization										
Technology					392.45	0.02%				
Computer Peripherals										
Copiers and Fax										
Office Machines										
Telephones and Communication					392.45	0.02%				
Total	40.69	0.00%	53.30	0.00%	472.19	0.02%	1,029.96	0.05%	80.58	0.00%

Matrix  
Rows  
-> Product  
Column  
Value  
Sales

Matrix:  
Rows -> Product Category  
-> Product Sub-Category  
Columns -> City  
Values -> TotalSales -> SalesPct

Funnel: Group -> Customer Segment | Values -> TotalSales



Create Page:  
SalesByCategory

Region	เดือน	หมวดหมู่	รวม	รวม	รวม	รวม	หมวดหมู่	รวม	รวม	รวม	รวม
	Product Category	TotalSales	Sum of Shipping Cost	Sum of Profit	Sum of Profit	TotalSales	Sum of Shipping Cost	Sum of Profit	Sum of Profit	TotalSales	TotalSales
Central											
East											
South											
West											
	☐ Furniture	87,567.19	2,051.87	-8,541.92	-8,541.92	125,695.12	2,665.65	10,842.46	10,842.46	88,442.19	88,442.19
	Bookcases	20,284.38	440.26	-11,130.21	-11,130.21	12,060.94	199.84	4,224.79	4,224.79	35,944.66	35,944.66
	Chairs & Chairmats	40,394.15	757.13	4,363.83	4,363.83	48,962.28	904.07	1,735.17	1,735.17	16,987.17	16,987.17
	Office Furnishings	19,506.57	403.74	2,746.74	2,746.74	16,299.08	288.21	2,622.87	2,622.87	9,840.19	9,840.19
	Tables	7,382.09	450.74	-4,522.27	-4,522.27	48,372.82	1,273.53	2,259.63	2,259.63	25,670.19	25,670.19
	☐ Office Supplies	68,993.72	1,711.09	403.22	403.22	42,256.71	1,207.33	327.68	327.68	68,019.19	68,019.19
	Appliances	10,426.62	347.72	2,573.47	2,573.47	4,988.35	99.58	1,441.58	1,441.58	7,080.19	7,080.19
	Binders and Binder Accessories	22,858.73	307.20	4,204.43	4,204.43	10,054.00	186.38	1,197.90	1,197.90	34,330.19	34,330.19
	Envelopes	580.51	55.17	-164.08	-164.08	495.31	18.64	175.39	175.39	1,275.19	1,275.19
	Labels	2,005.17	61.70	601.79	601.79	722.63	8.93	286.98	286.98	555.19	555.19
	Paper	3,923.58	229.94	-36.43	-36.43	7,426.69	268.53	-808.68	-808.68	7,748.19	7,748.19
	Pens & Art Supplies	2,963.16	90.37	-1,912.41	-1,912.41	7,378.65	90.32	953.76	953.76	3,063.19	3,063.19
	Rubber Bands	101.94	6.21	-82.80	-82.80	139.20	8.23	-1,231.83	-1,231.83	127.19	127.19
	Scissors, Rulers and Trimmers	256.93	14.15	-47.49	-47.49	369.45	18.76	-1,062.28	-1,062.28	3,561.19	3,561.19
	Storage & Organization	25,877.08	598.63	-4,733.27	-4,733.27	10,682.43	507.96	-625.15	-625.15	10,277.19	10,277.19
	☐ Technology	118,206.01	1,053.09	9,182.38	9,182.38	158,149.64	792.57	24,774.51	24,774.51	115,234.19	115,234.19
	Computer Peripherals	12,047.62	177.83	-255.49	-255.49	8,953.94	158.67	1,470.92	1,470.92	8,842.19	8,842.19
	Total	274,766.92	4,816.05	1,043.68	1,043.68	326,101.47	4,665.55	35,944.66	35,944.66	271,696.19	271,696.19

Table:  
Values -> Region

Matrix:  
Rows->Product Category->Product Sub-Category  
Columns -> Order Date (Month)  
Values -> TotalSales -> Sum of Shipping Cost -> Sum of Profit

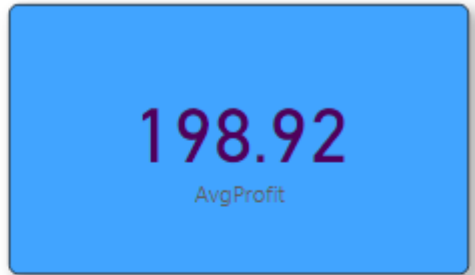
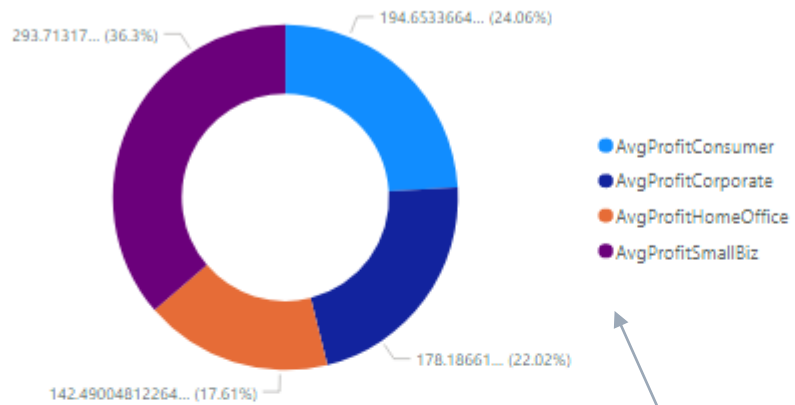
Table:  
Order Date  
(Year,Month)

Create Page:  
AvgProfitbySegment

AvgProfitConsumer, AvgProfitCorporate, AvgProfitHomeOffice and AvgProfitSmallBiz

- ปี เดือน
- 2015 เมษายน
  - 2015 พฤษภาคม
  - 2015 มิถุนายน
  - 2015 กรกฎาคม
  - 2015 สิงหาคม
  - 2015 กันยายน

- ปี ไตรมาส
- 2015
- ☐ Qtr 1
  - ☒ Qtr 2
  - ☐ Qtr 3
  - ☐ Qtr 4



Card:  
Fields -> AvgProfit  
Change Background,  
Border,Shadow

Slicer:  
Order Date  
(Year,Month)

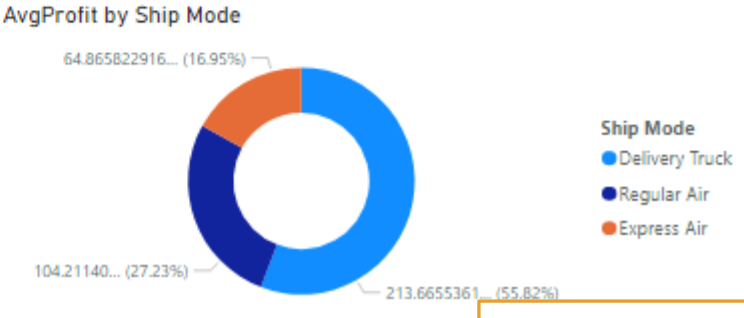
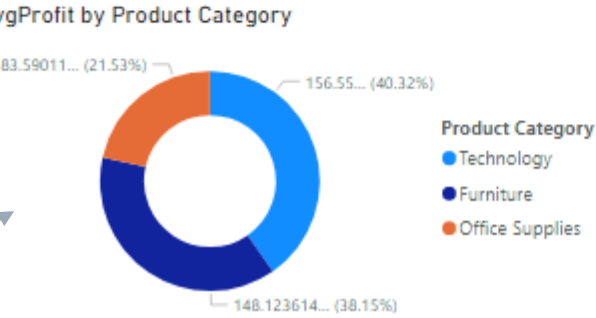
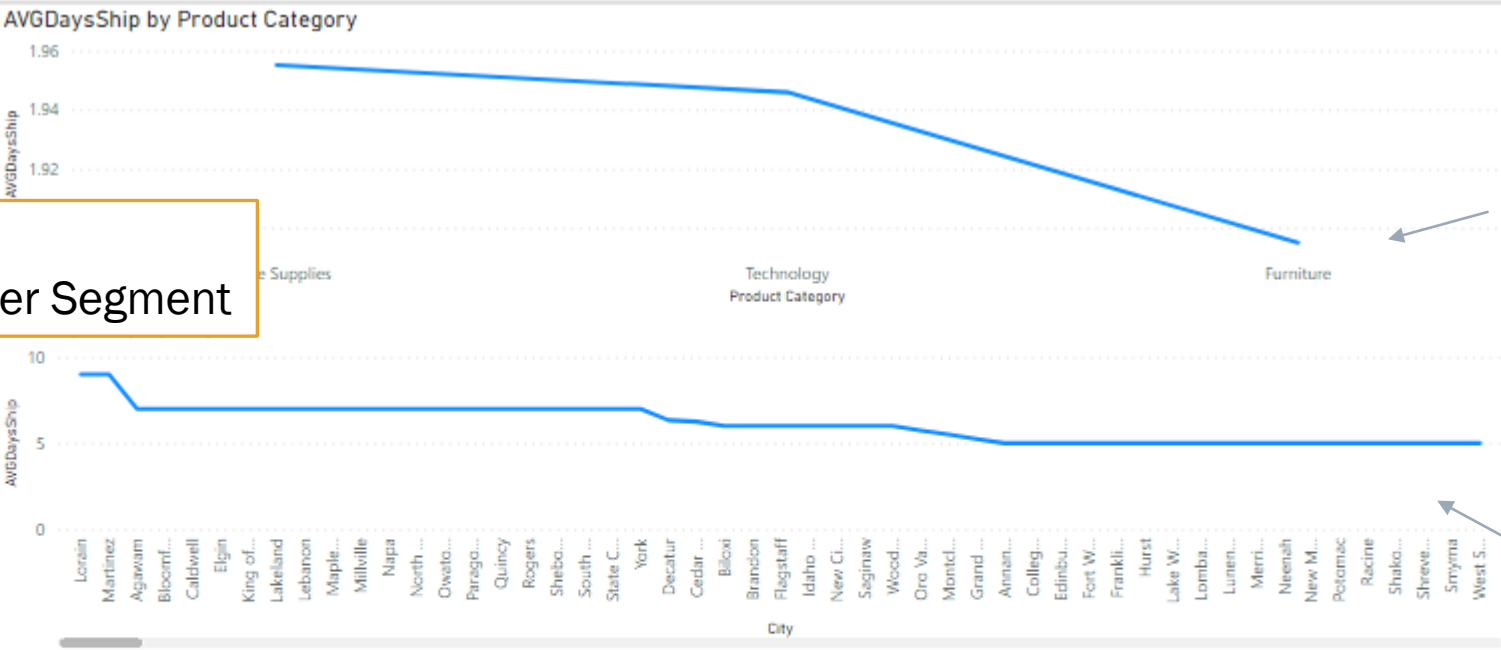
Donut:  
Values:  
AvgProfitConsumer  
AvgProfitCorporate  
AvgProfitHomeOffice  
AvgProfitSmallBiz

Create Page:  
DaysShip

Table:  
Values -> Customer Segment

Line chart:  
Axis: Product Category  
Values: AVGDaysShip

Line chart:  
Axis: City  
Values: AVGDaysShip



Line chart:  
Details -> Product Category  
Values -> AvgProfit

Line chart:  
Details -> Ship Mode  
Values -> AvgProfit

Product Category

Furniture  
Office Supplies  
Technology

ปี เดือน

2015 มกราคม  
2015 กุมภาพันธ์  
2015 มีนาคม  
2015 เมษายน  
2015 พฤษภาคม  
2015 มิถุนายน  
2015 กรกฎาคม  
2015 สิงหาคม  
2015 กันยายน  
2015 ตุลาคม  
2015 พฤศจิกายน  
2015 ธันวาคม

Sum of Profit by City



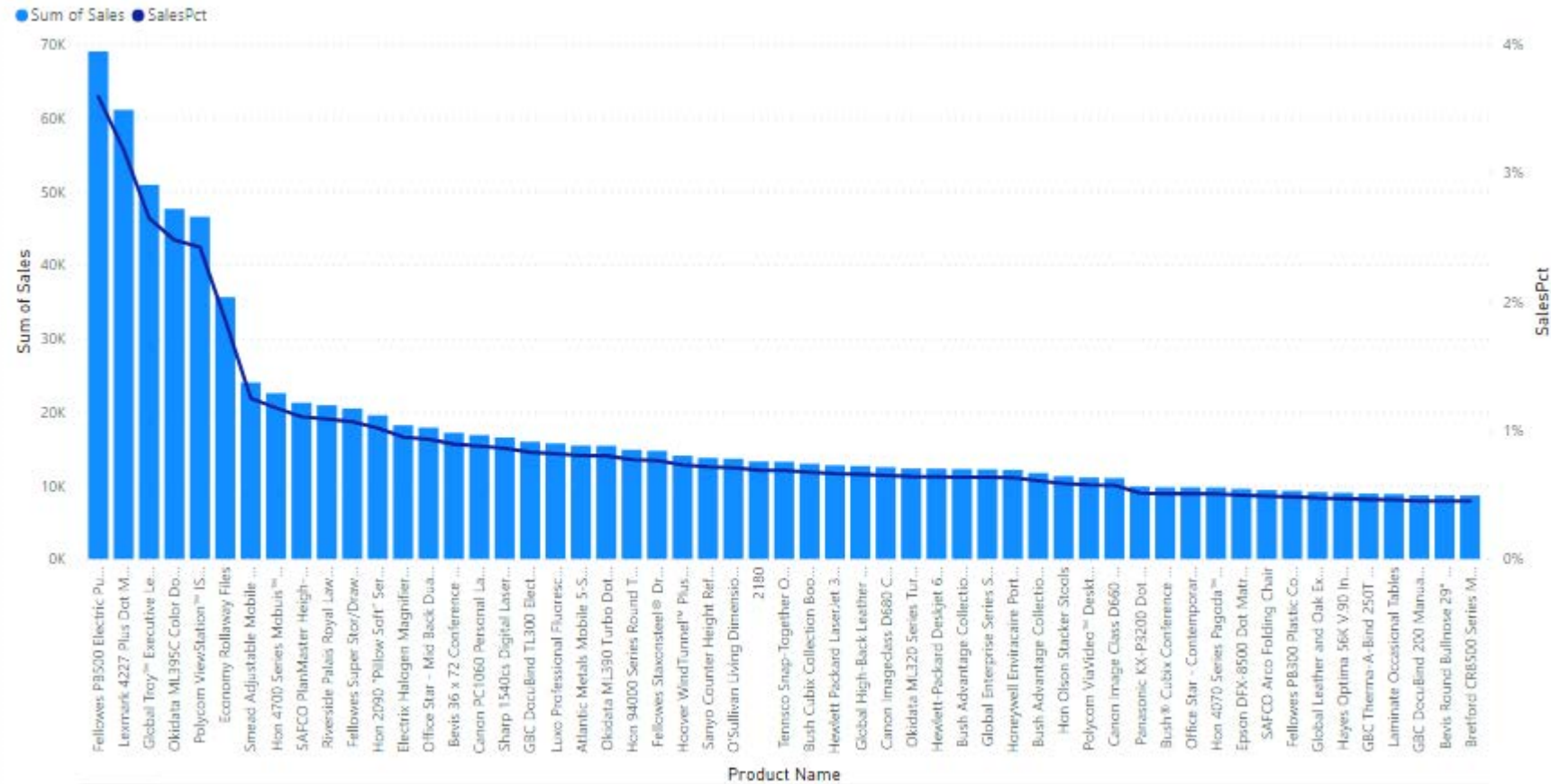
Average of Shipping Cost by City



Create Page:  
ShippingCostbyCity

► SalesBySegment SalesByCategory AvgProfitbySegment DaysShip **ShippingCostbyCity** SalesvsSalesPct Sales&Pareto

Sum of Sales and SalesPct by Product Name



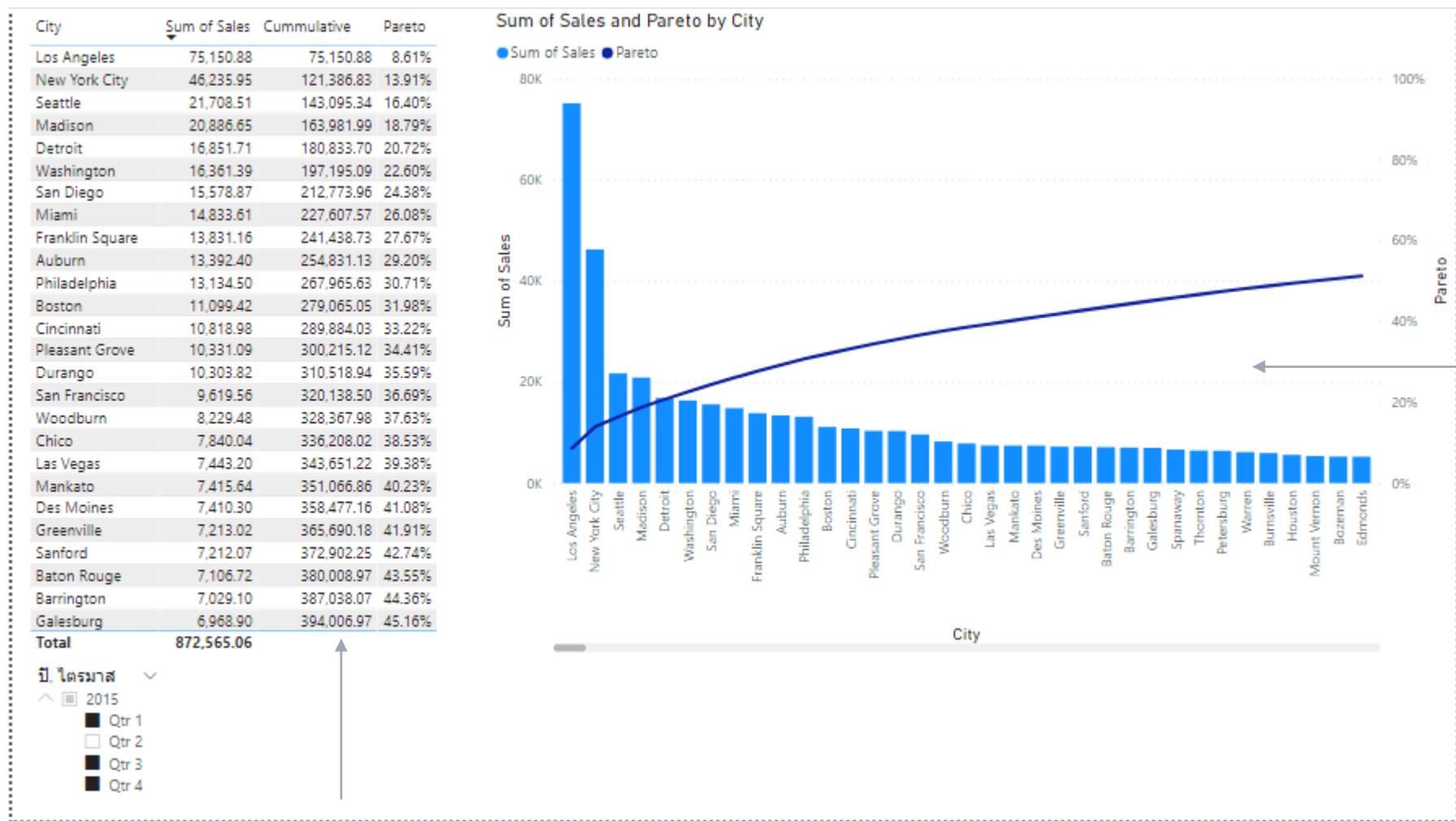
Create Page:  
SalesvsSalesPct

Line and Stack  
Column:  
Shared Axis: Product  
Name  
Column Values: Sum  
of Sales  
Line Values: SalesPct

Create Measure:

```
Pareto =  
DIVIDE(  
    Orders[Cummulative],  
    CALCULATE(  
        SUMX(  
            Orders,Orders[Sales]),  
            ALLSELECTED(Orders[City]  
        )  
    )  
)
```





Create Page:  
Sales&Pareto

Line & Stack  
Column:  
Sahred axis -> City  
Column Values ->  
Sum of Sales  
Line values ->  
Pareto

Create New Measures: Cumulative



Create Measures:

```
Cummulative =  
VAR TSales = CALCULATE(SUM(Orders[Sales]),ALLSELECTED(Orders[Sales]))  
VAR currentSales = SUM(Orders[Sales])  
VAR SUMMARIZEDTABLE =  
SUMMARIZE(  
    ALLSELECTED(Orders),  
    Orders[City],  
    "AcSales",SUM(Orders[Sales])  
)  
VAR CumSales =  
SUMX(  
    FILTER(SUMMARIZEDTABLE,[AcSales]>=currentSales),  
    [AcSales]  
)  
RETURN  
CumSales
```

# Exercise 3

---

P6-AMAZINGMARTEU2GEO.XLSX

YER-ON-YEAR

## Create Date Table

✕ ✓

1 Dates = CALENDAR(DATE(2012,1,1),DATE(2020,12,31))

Date ▾

1/1/2012

1/2/2012

1/3/2012

1/4/2012

1/5/2012

1/6/2012

Fields

Search

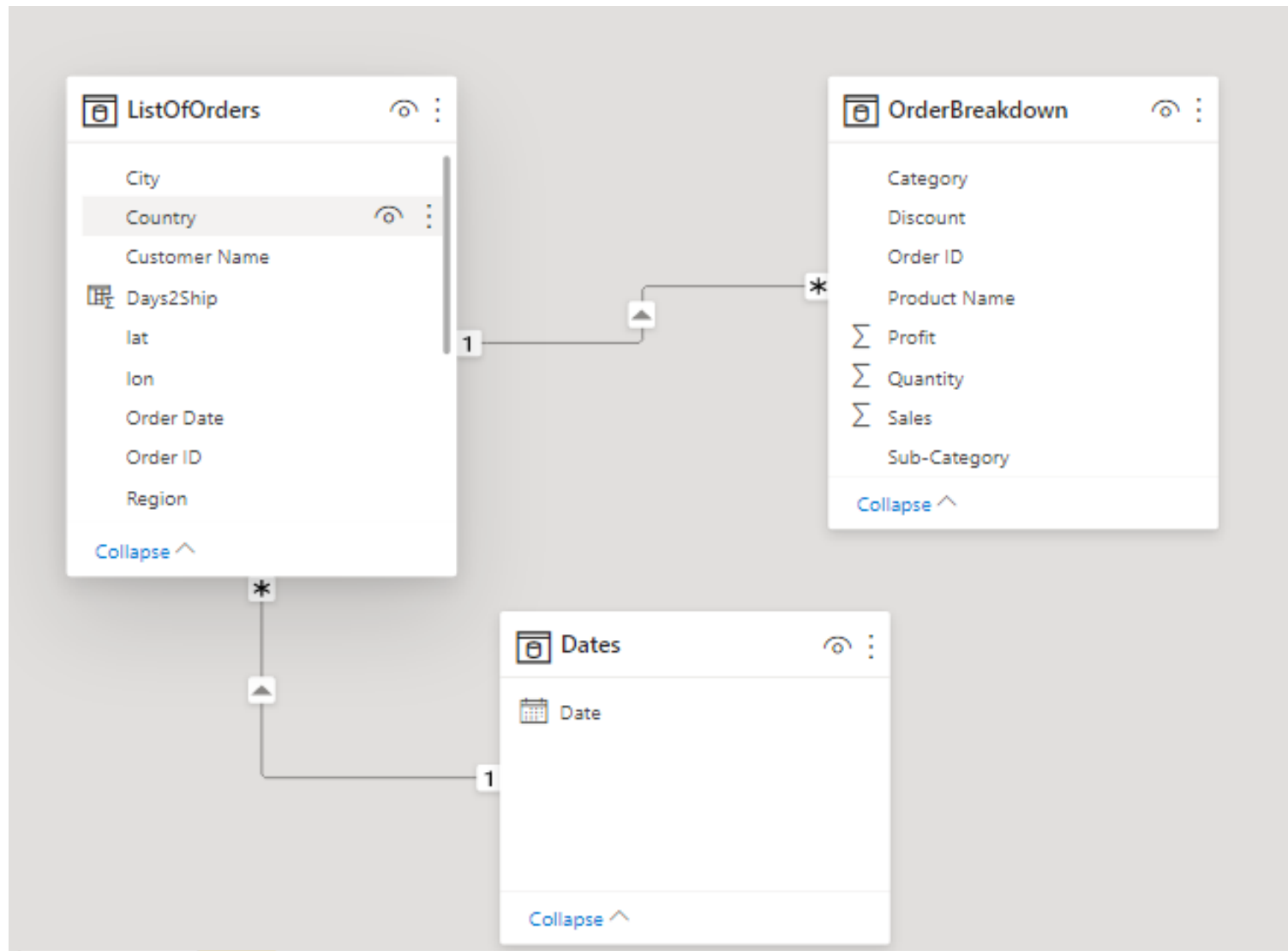
✓ Dates

✓ Date

> ថ្ងៃ សាច់បង់បង់

✓ ListOfOrders

## Relationships



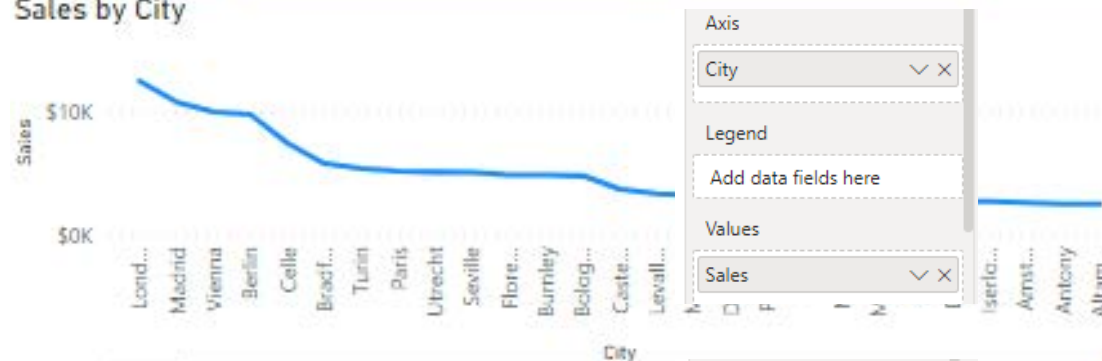


lat and lon



Bing

Sales by City



Axis

City

Legend

Add data fields here

Values

Sales

Profit by Ship Mode

Details

Ship Mode

Values

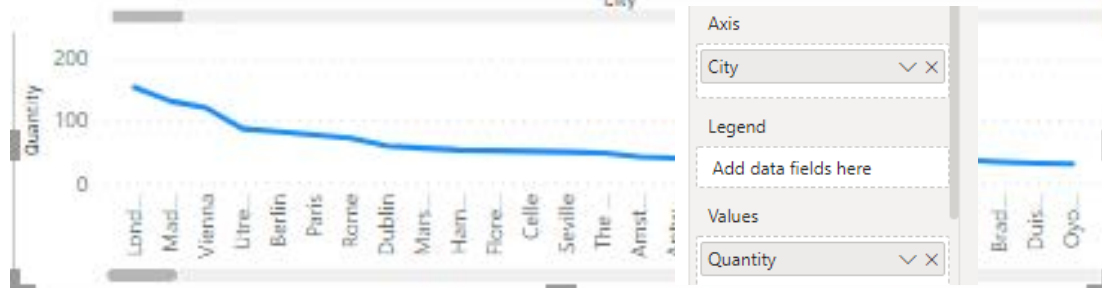
Profit



Ship Mode

Priority

- Ship Mode
- ☐ Economy
  - ☐ Economy Plus
  - ☐ Immediate
  - ☒ Priority



Axis

City

Legend

Add data fields here

Values

Quantity

Profit by City



Axis

City

Legend

Add data fields here

Values

Profit

Create columns:

```
Days2Ship = DATEDIFF(ListOfOrders[Order Date],ListOfOrders[Ship Date],DAY)
```

Create Measures:

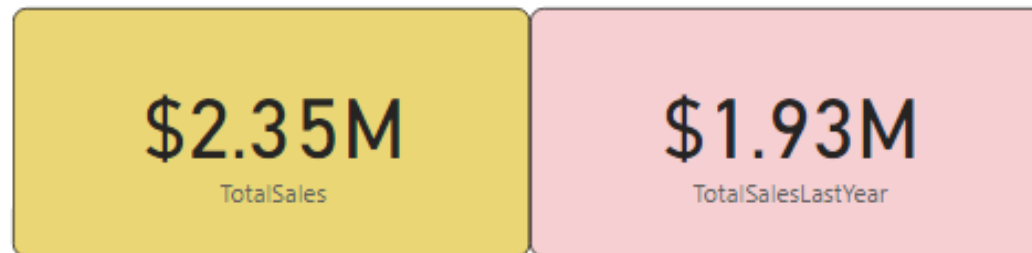
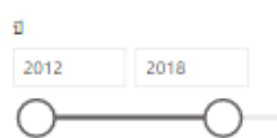
```
AvgShiipDay = AVERAGEX(ListOfOrders,ListOfOrders[Days2Ship])
```

```
TotalSales = SUM(OrderBreakdown[Sales])
```

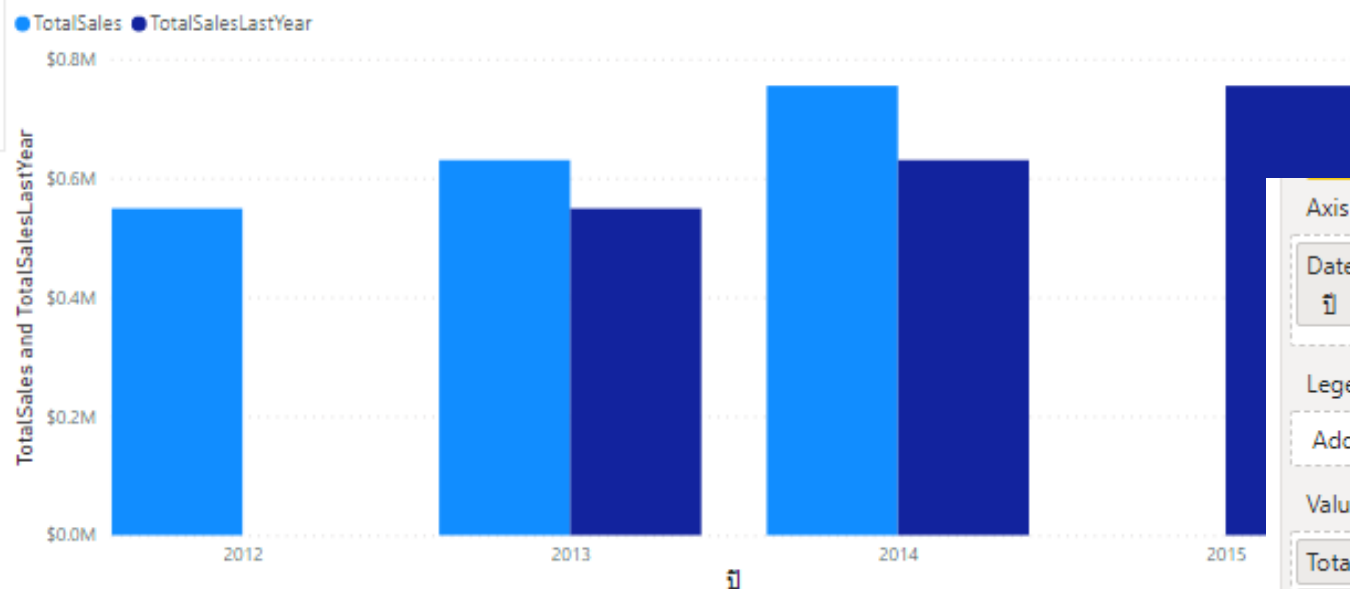
```
TotalSalesLastYear = CALCULATE([TotalSales],SAMEPERIODLASTYEAR(Dates[Date]))
```

```
YoY% = DIVIDE([TotalSalesLastYear],[TotalSales])
```

ปี	ไตรมาส	Sales	TotalSalesLastYear	YoY%
2014	Qtr 3	\$250,853	\$181,576	0.72
2014	Qtr 4	\$215,502	\$168,130	0.78
2013	Qtr 3	\$181,576	\$185,233	1.02
2013	Qtr 4	\$168,130	\$157,043	0.93
2014	Qtr 2	\$167,945	\$158,793	0.95
2013	Qtr 2	\$158,793	\$119,890	0.76
2013	Qtr 1	\$121,725	\$86,714	0.71
2014	Qtr 1	\$120,730	\$121,725	1.01
2015	Qtr 1		\$120,730	
2015	Qtr 2		\$167,945	
2015	Qtr 3		\$250,853	
2015	Qtr 4		\$215,502	
Total		\$1,385,254	\$1,934,134	1.40



TotalSales and TotalSalesLastYear by ปี



Axis

Date
 

ปี

Legend

Add data fields here

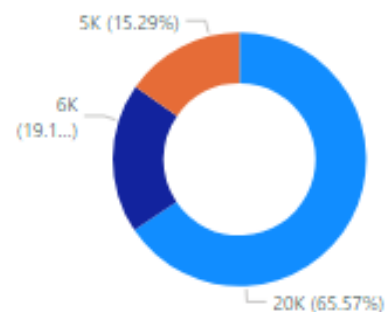
Values

TotalSales

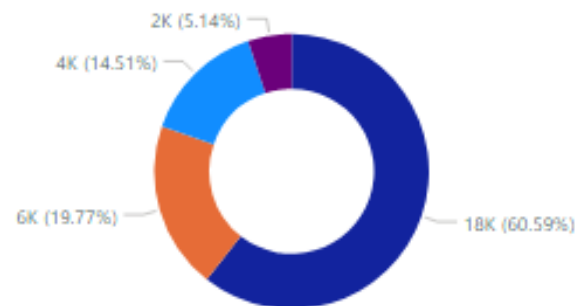
TotalSalesLastYear



Quantity by Category



Quantity by Ship Mode



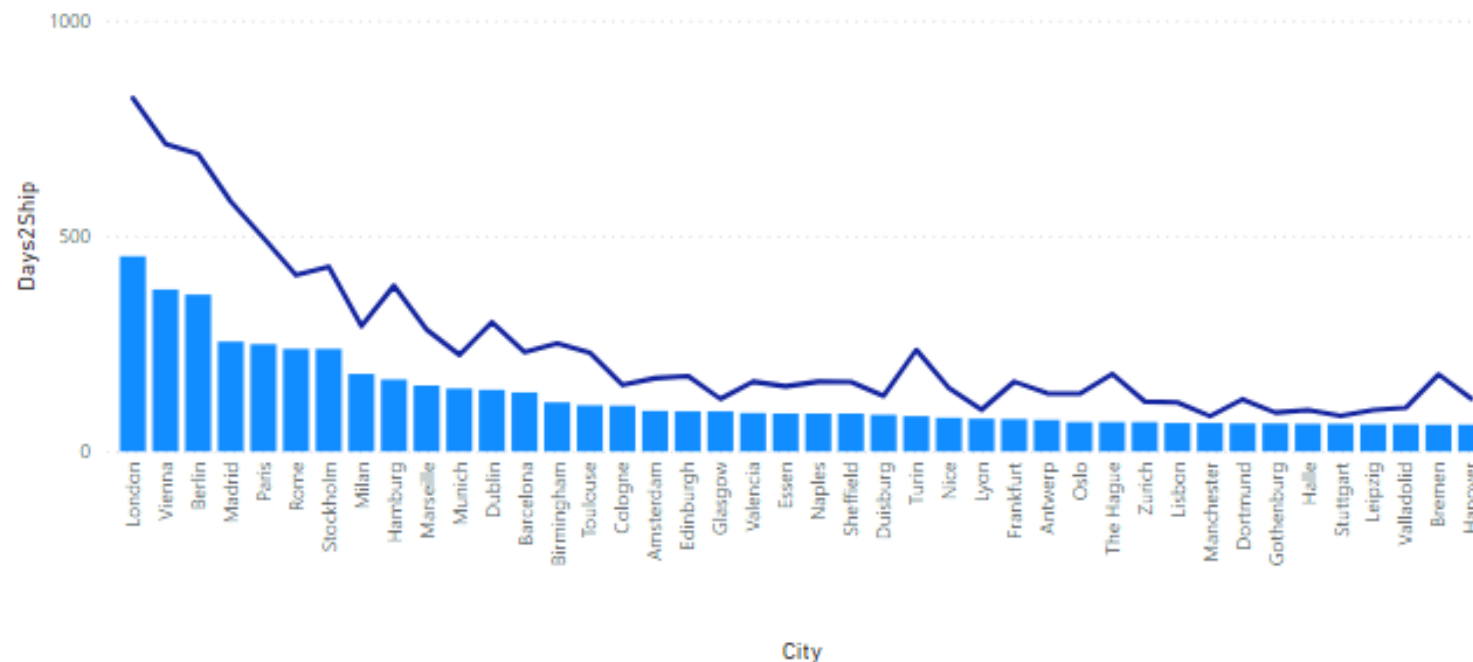
3.97

AvgShipDay

City	Economy	Economy Plus	Immediate
Aachen	20		
Aalen	6		
Aalst	5		
Abbeville	5		
Aberdeen	4		
Acerra	5		
Acireale	16	4	
Afragola	7		
Agde	7		
Agen	4	5	
Agrigento		6	
Aix-en-Provence	21	11	
Aix-les-Bains		2	
Ajaccio			
Albacete	4	4	
Albertville	5		
Albi	7	4	
Alcobendas	4	5	
Alessandria	4		
Alfortville	4	2	
Alicante	8	5	
Total	12257	2698	

Days2Ship and Quantity by City

Days2Ship Quantity



CityMapping

YoY

Ship&amp;Order



# End of Session 2

---