Summer Internship Project
Report On
Power BI

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Mr. Sanjay Shukla (External)

Submitted to
Department of Computer Science & Engineering
Institute of Computer Technology

Ganpat University
॥ विद्यया समाजोत्कर्षः ॥
Institute of Computer Technology

Year: 2021

CERTIFICATE

This is to certify that the Summer Internship Project work entitled **"Power BI"** by Dishwa Shah (19162121038) of Ganpat University, towards the fulfillment of requirements of the degree of Bachelor of Technology – Computer Science and Engineering, carried out by her in the CSE (BDA) Department at Intas Pharmaceutical Ltd. The results/findings contained in this Project have not been submitted in part or full to any other University / Institute for award of any other Degree/Diploma.

Name & Signature of Internal Guide

Name & Signature of Head

Place: ICT - GUNI
Date:

ACKNOWLEDGEMENT

Summer Internship project is a golden opportunity for learning and self-development. I consider myself very lucky and honored to have so many wonderful people lead me through in completion of this project. First and foremost, I would like to thank **Dr. Hemal Shah,** Principal, ICT, and Prof. Dharmesh Darji, Head, ICT who gave us an opportunity to undertake this project. My grateful thanks to **Prof. Aniket Patel & Mr. Sanjay Shukla (Internal & External Guides)** for their guidance in project work **Power BI**, who despite being extraordinarily busy with academics, took time out to hear, guide and keep us on the correct path. We do not know where would have been without his help. CSE department monitored our progress and arranged all facilities to make life easier. We choose this moment to acknowledge their contribution gratefully.

DISHWA SHAH (Enrollment No: 19162121038)

ABSTRACT

By creating dashboards using Power BI which is a business analytics service by Microsoft, we can analyze the data and tell a story through visualizations which is exactly what I have done through this internship. It has helped me a lot and has taken the world of BI and Data Visualization. It has become a serious platform for use in small and medium organizations. Its Quick Insights feature is one of the best features. The entire platform is built on growing a set of advanced analytical algorithms. It can build multiple reports without any need of human intervention. This report is meant to show how effortlessly a dataset can be transferred to a visualized dashboard which can also be shared with ease.

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Title Page No.

CHAPTER 1: INTRODUCTION

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Power BI is a tool for data visualization that converts data from sources like Excel and SQL to interactive dashboards and reports. Being a data science student, I found it very helpful to learn how to create such dashboards and I have created 6 of them which will be explained in detail in this report.

The tools we had to use to make this report are:

- Microsoft Excel
- Microsoft Power BI

CHAPTER 2: PROJECT SCOPE

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The project is limited to only Microsoft Power BI. It can be used to create dashboards, reports and analyzing and organizing datasets.

Power BI developers can be recruited as data analysts, software engineers and developers and business analysts as well.

CHAPTER 3: SOFTWARE AND HARDWARE REQUIREMENTS

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Minimum Hardware Requirements

Processor	1.0 GHz x64
RAM	2GB
HDD	1GB

Table 3.1 Minimum Hardware Requirements

Minimum Software Requirements

Operating System	Windows 7 / Windows Server 2008 R2, or later
Programming language	DAX, M and R for users who want to go beyond the options presented by GUI
Other tools & tech	Microsoft Power BI

Table 3.2 Minimum Software Requirements

CHAPTER 4: PROCESS MODEL

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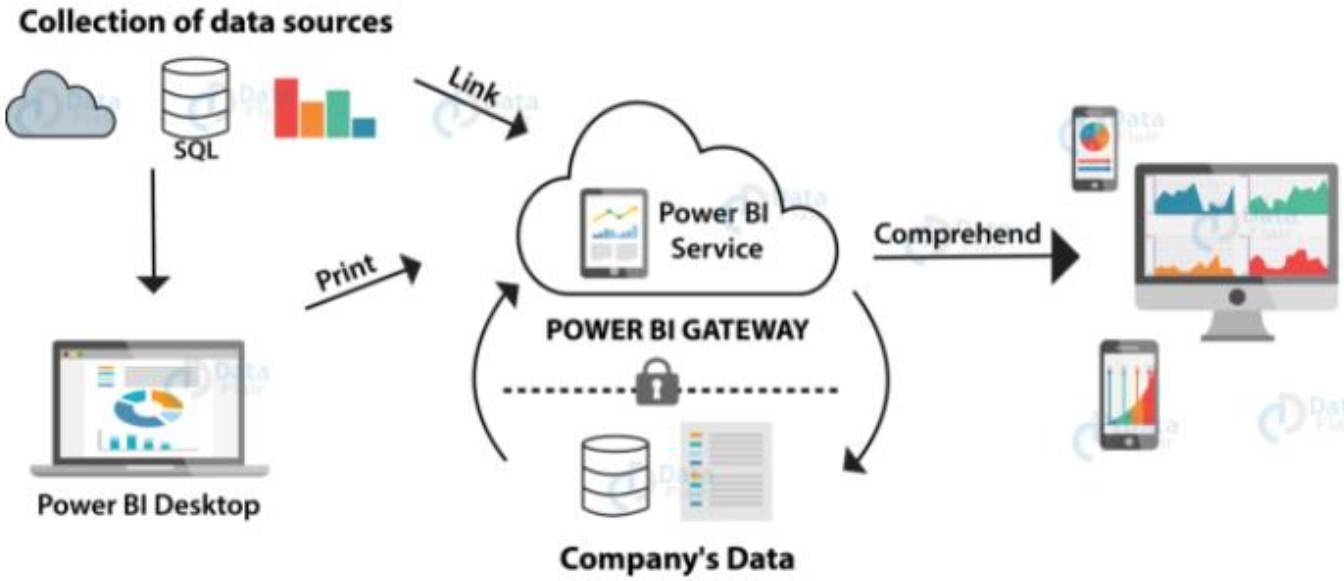


CHAPTER 5: PROJECT PLAN

CHAPTER 5: PROJECT PLAN

5.1 List of Major Activities

Task: 1. Download Power BI Desktop
Task: 2. Install Power BI Desktop
Task: 3. Import data to Power BI Dashboard
Task: 4. Format and clean the data in Power BI Dashboard
Task: 5. Create Data Visualization in Power BI Dashboard

5.2 Estimated Time Duration in Hours

Task: 1. Less than an hour
Task: 2. Less than an hour
Task: 3. 0.5 hours
Task: 4. 1 hour (depends on the size of data)
Task: 5. 4-5 hours (depends on the requirements of client)

CHAPTER 6: DASHBOARDS

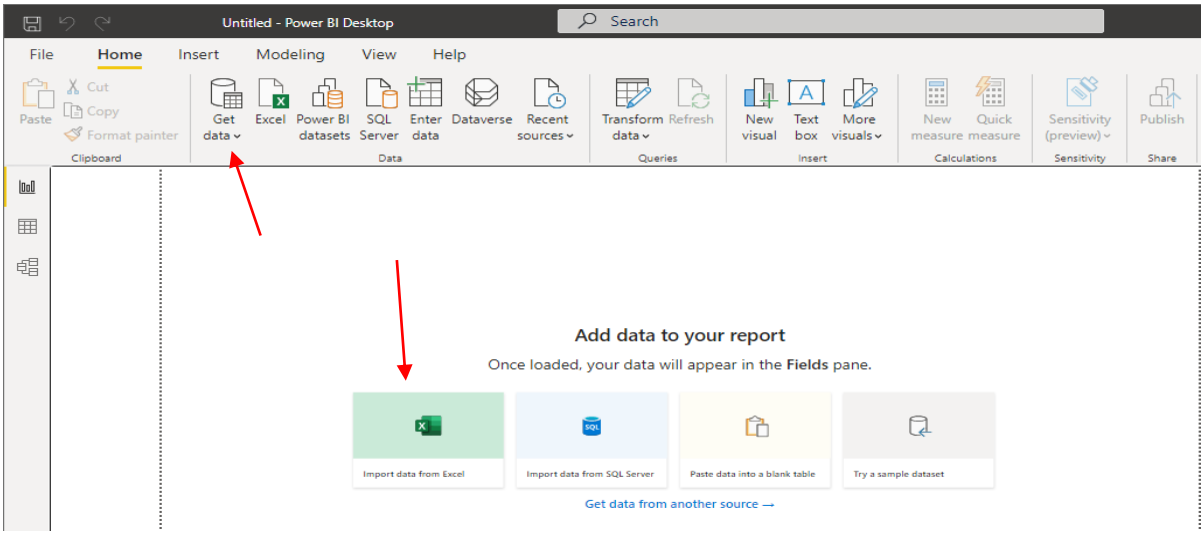
HOW TO DOWNLOAD AND INSTALL POWER BI DESKTOP?

To download Power BI Desktop, visit the following link:
https://www.microsoft.com/store/productId/9NTXR16HNW1T

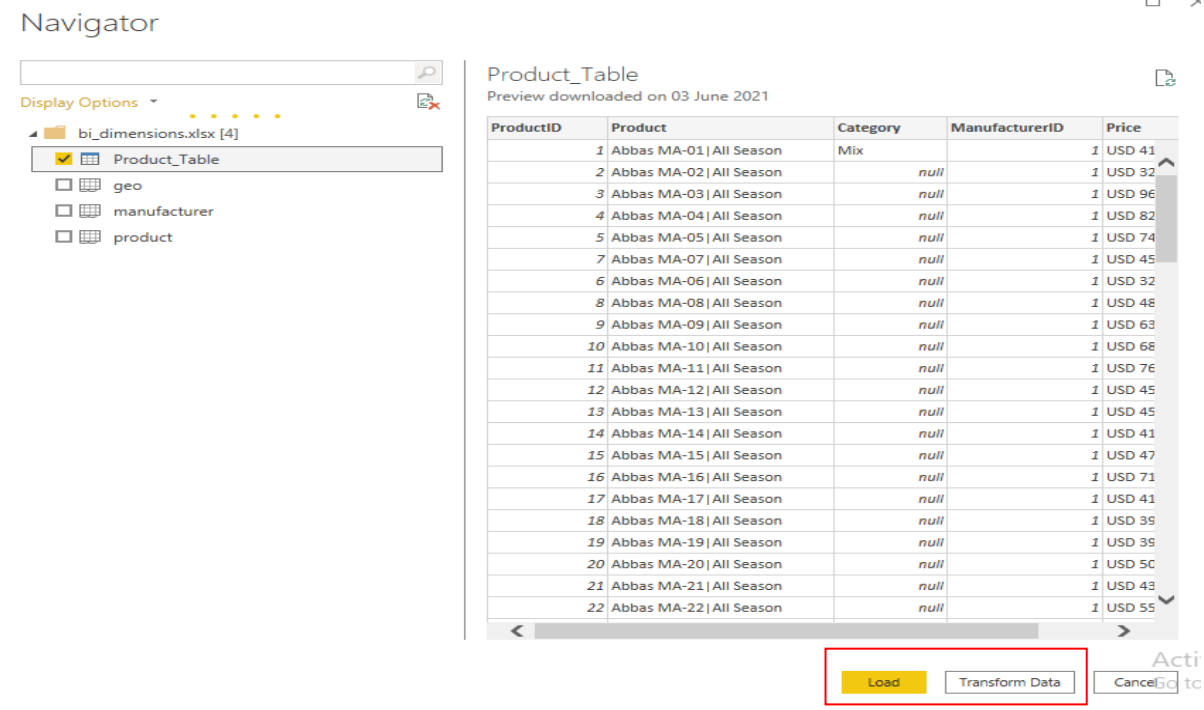
Once the download is completed, install the tool on your device to use it for free.
You can also get the licensed version if you want to use some exclusive graphics.

HOW TO IMPORT DATA FROM EXCEL?

Step 1: To import data from Excel, you can either click on 'Get data' on the ribbon or on 'Import data from Excel' on the workspace.



Step 2: Once you select .xlsx file you want to open, it will redirect you to the following page.



Step 3: If you want to clean or format the data, click on ‘Transform Data’, otherwise click on ‘Load’ to start working on the connections and visualizations.

FORMATTING/CLEANING THE DATA:

Deleting unnecessary items or columns from the tables is called cleaning the data. It includes:

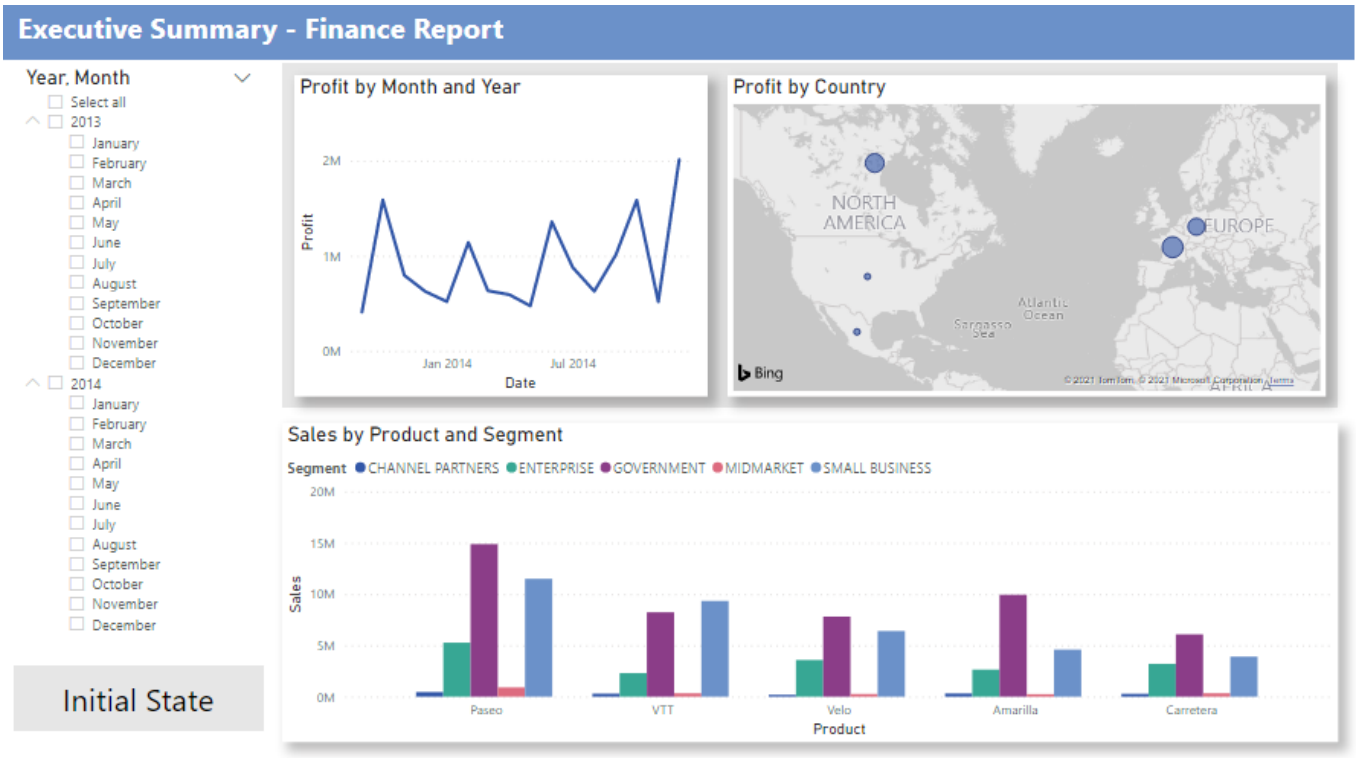
- Deleting unnecessary columns
- Changing data types of various columns
- Changing format of date
- Filtering data according to the requirements
- Hiding columns from the report and many more…
-

Renaming or adding rows and measures and various other functions are included in formatting the data. It includes:

- Adding and renaming columns
- Using DAX to add new columns or measures
- Creating new tables
- Adding currency to values and many more…

In each dashboard, hierarchy, filters, connection models, themes, backgrounds and logos have been applied.

DASHBOARD 1

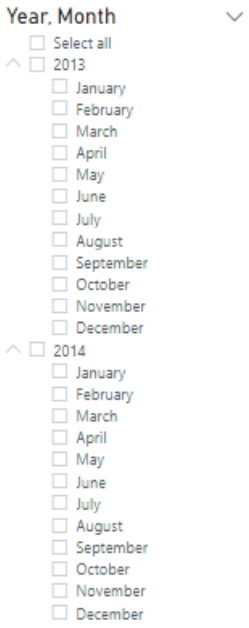


To create this dashboard, we have these 2 tables and their columns:

i. Calendar
   - Date

ii. Financials
   - Segment
   - Country
   - Product
   - Discount Band
   - Units Sold
   - Manufacturing Price
   - Sale Price
   - Gross Sales
   - Discounts
   - Sales
   - COGS
   - Profit
   - Date
   - Month Number
   - Month
   - Year

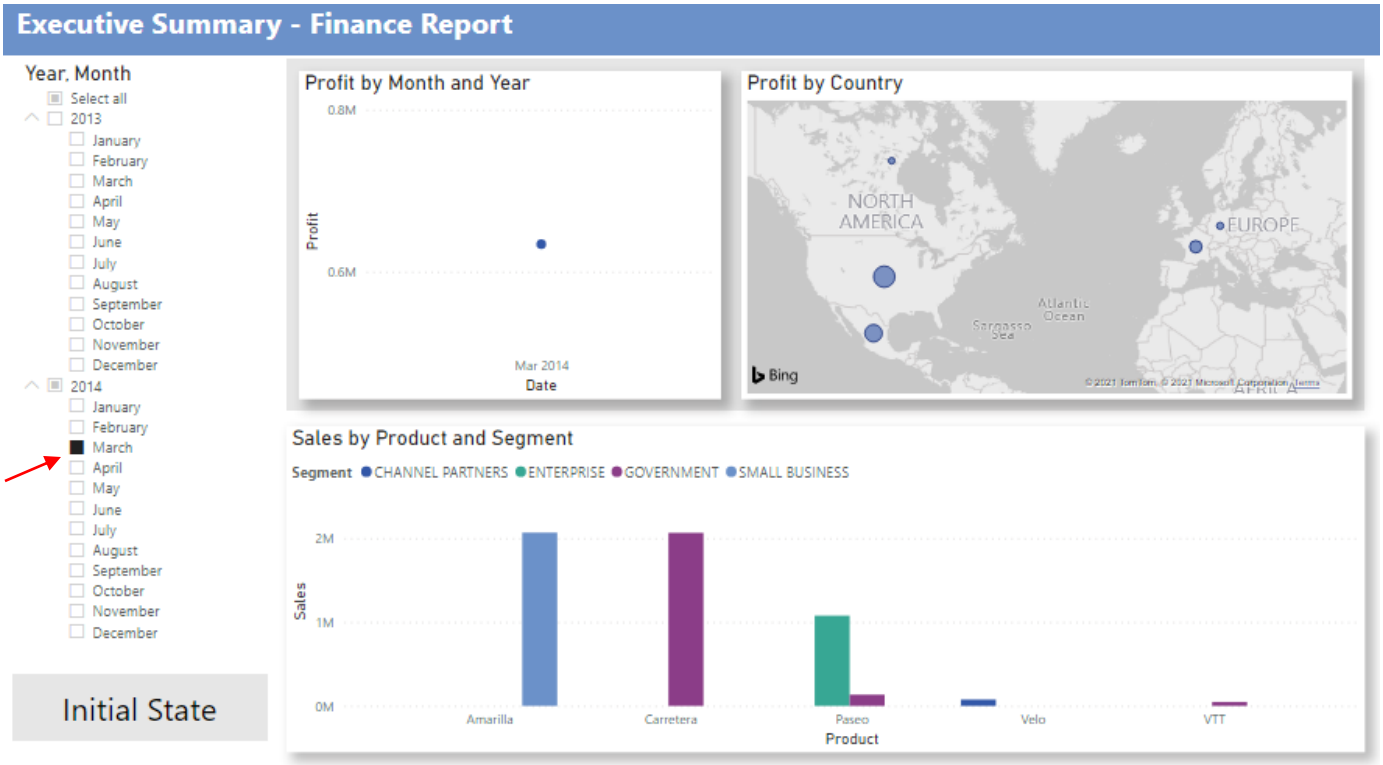
Now, let us get into the details of the content of this dashboard:

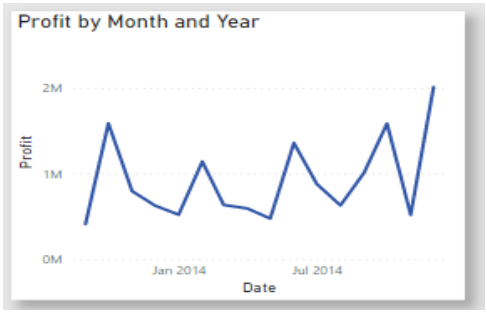


1) This is a **Slicer** that displays **Years** and their **Months**.

In **Field** section of Visualizations, **Year** and **Month** are placed.

This is how other content will get affected if we focus only on March of 2014 in this slicer:

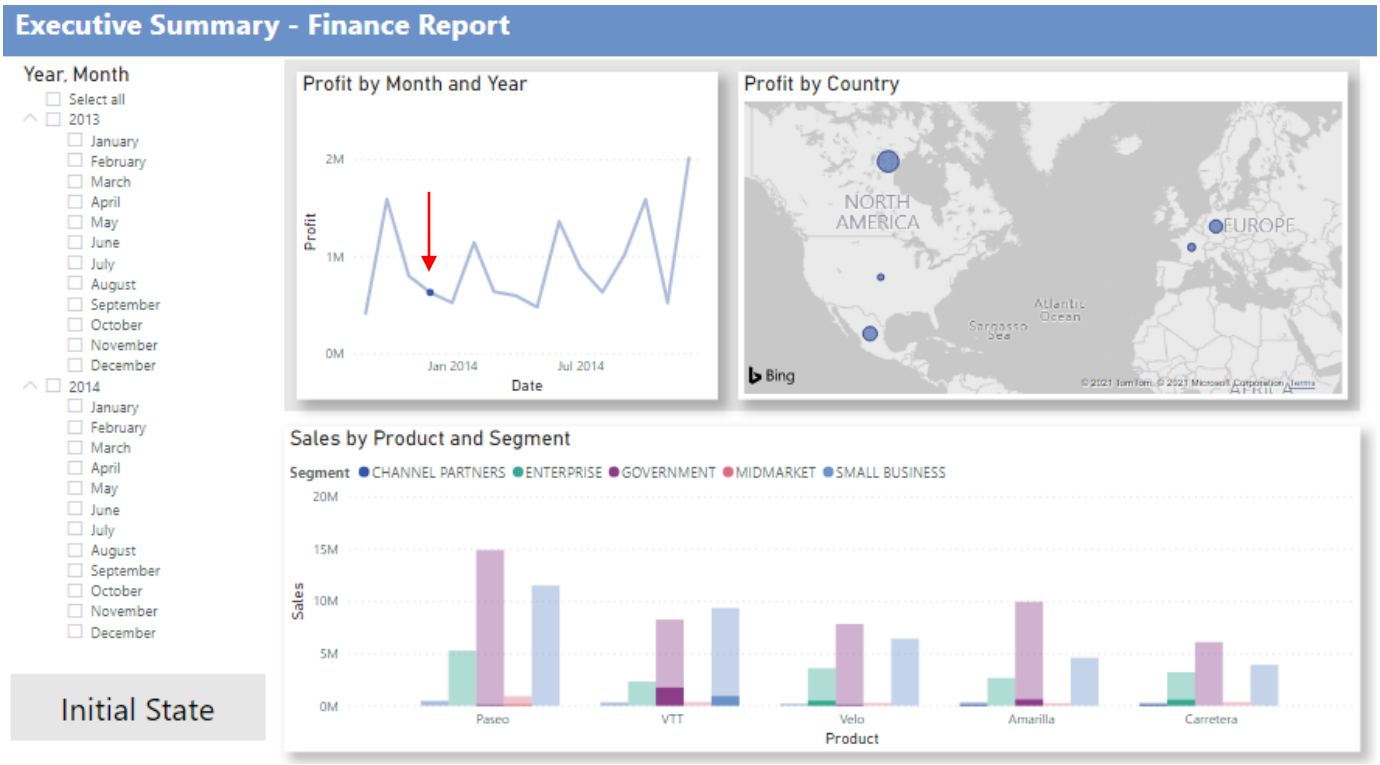




2) This is a **Line Chart** that displays **Profit by Month and Year.**

In **Axis** section of Visualizations, **Date** is placed and in **Values** section, **Profit** is placed.

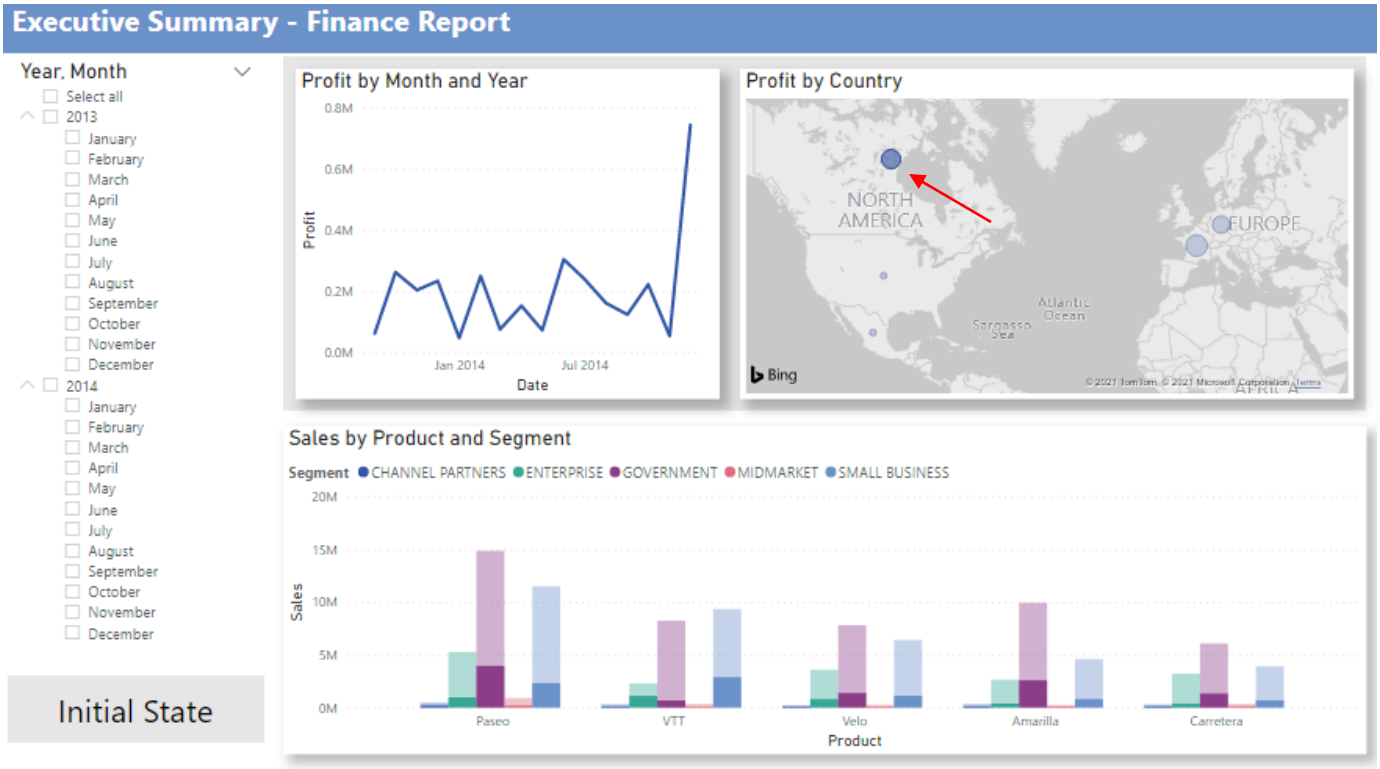
This is how other content will get affected if we focus only on this time period in this chart:



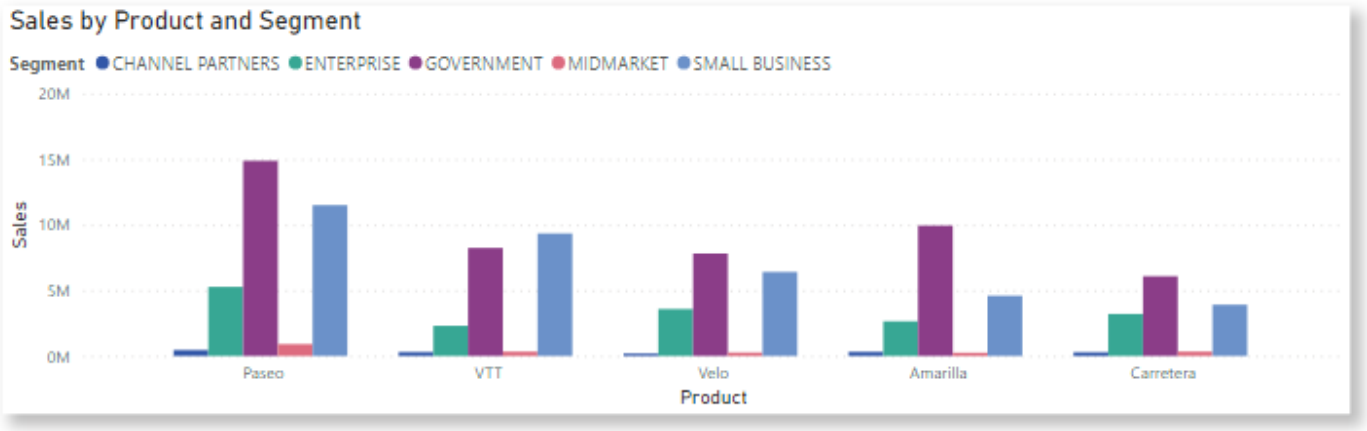
3) This is a **Map** that displays **Profit by Country**.

In **Location** section of Visualizations, **Country** is placed and in **Size** section, **Profit** is placed.

This is how other content will get affected if we focus only on this region in this chart:

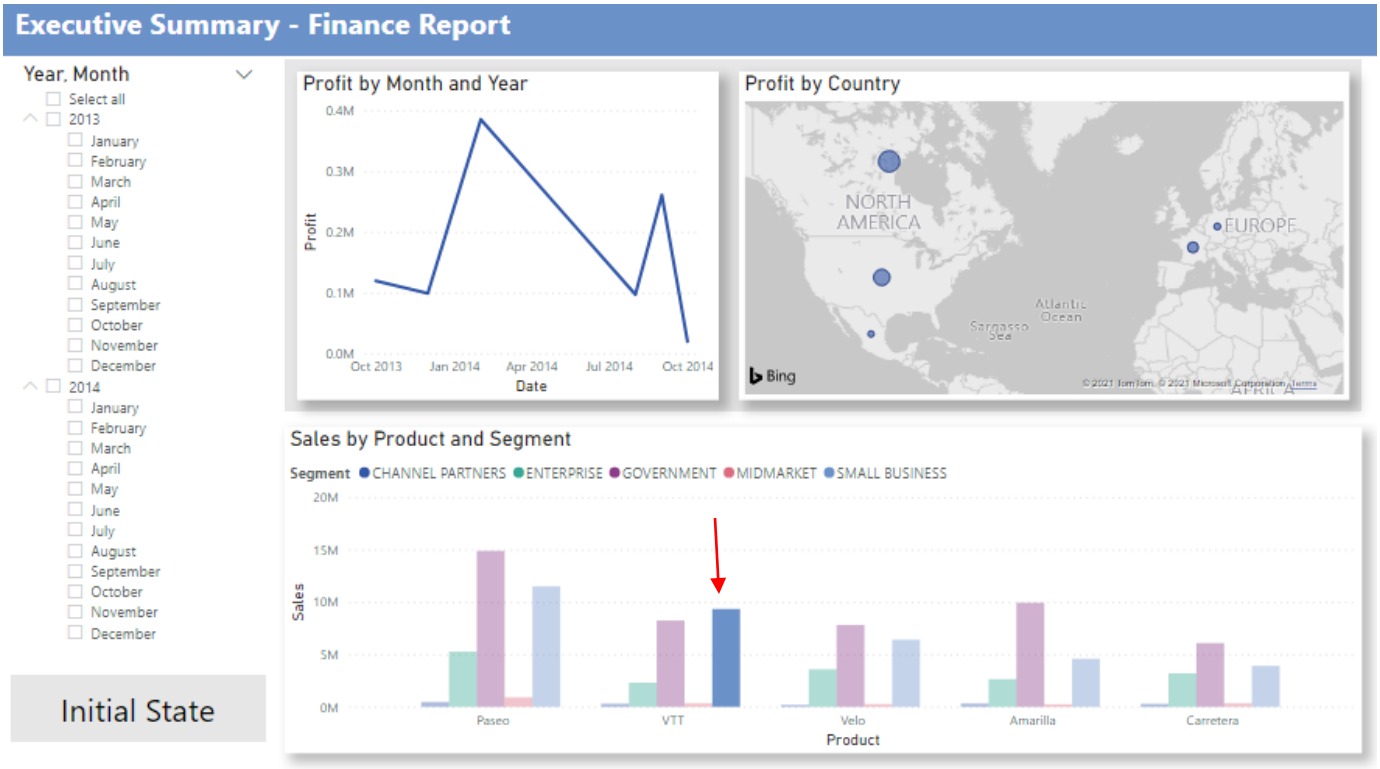


4) This is a **Clustered Column Chart** that displays **Sales by Product and Segment**.



In **Axis** section of Visualizations, **Product** is placed; in **Legend** section, **Segment** is placed and in **Values** section, **Sales** is placed.

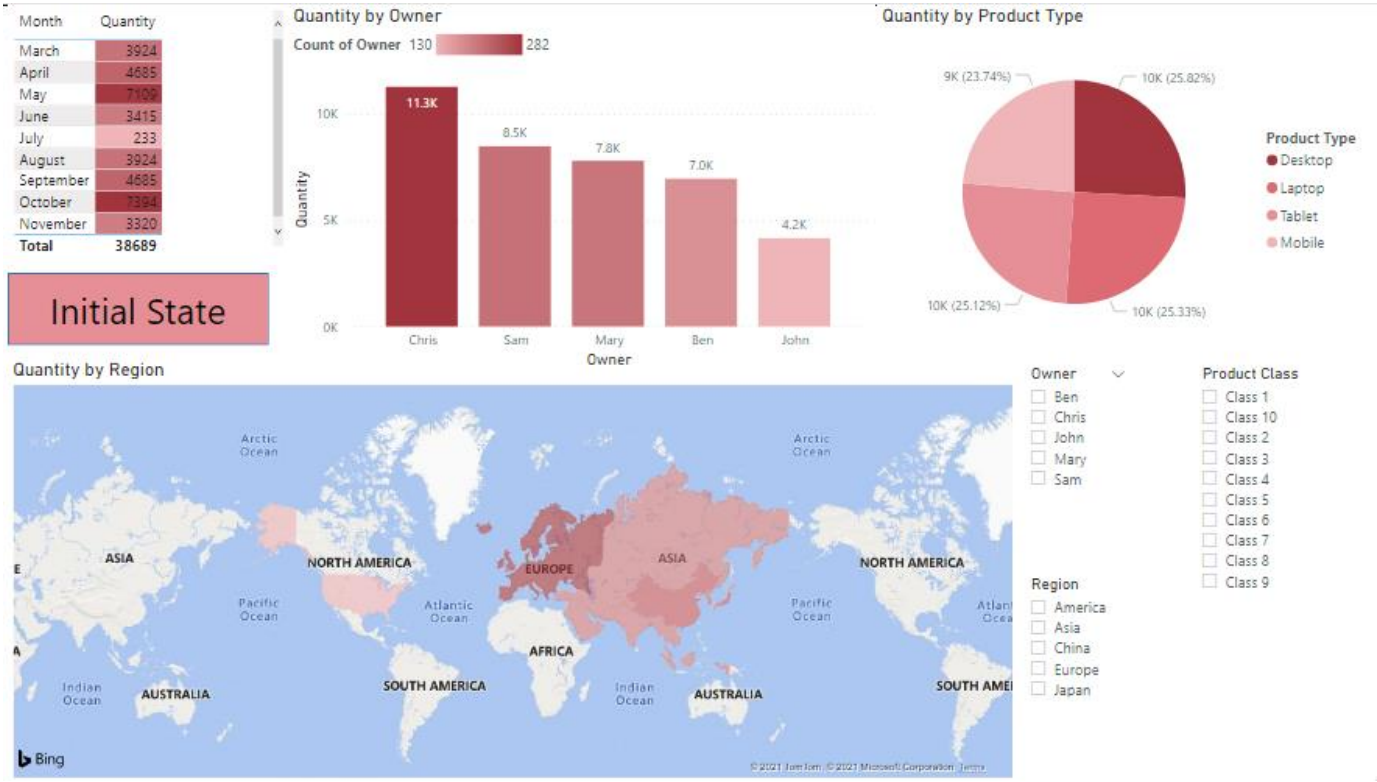
This is how other content will get affected if we focus only on Small Business of VTT in this chart:



Initial State

5) This is button created using 'Shapes' which will take us to the initial state of the dashboard by pressing **'Ctrl + Click'**. Create a **bookmark** at initial state and set it as an **Action** in the shape.

DASHBOARD 2



To create this dashboard, we have this table and its columns:

i. Data
- Product Type
- Part Number
- Month of Order
- Date of Order
- Product Class
- Region
- Owner
- Worldwide Customer Name
- Quantity
- Date of Delivery

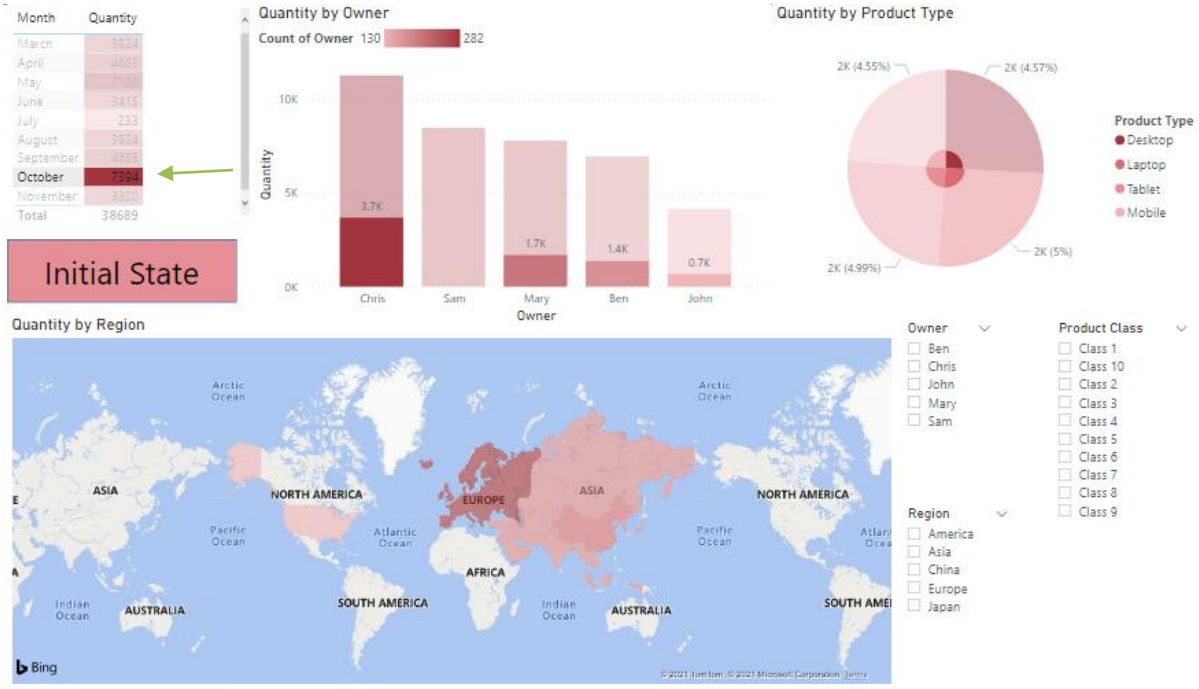
Now, let us get into the details of the content of this dashboard:

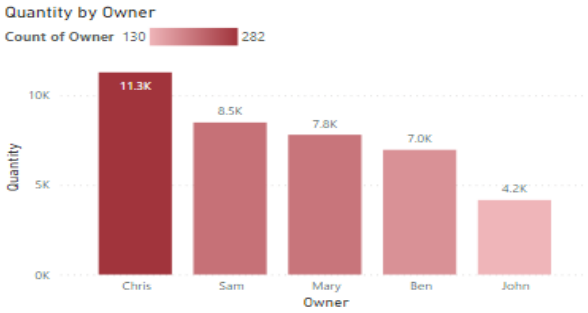
Month	Quantity
March	3924
April	4685
May	7109
June	3415
July	233
August	3924
September	4685
October	7394
November	3320
Total	**38689**

1) This is a **Table** that displays the **Quantity according to Month**.

In **Values** section of Visualizations, **Month of Order (Month)** and **Quantity** are placed.

This is how other content will get affected if we focus only on October in this table:

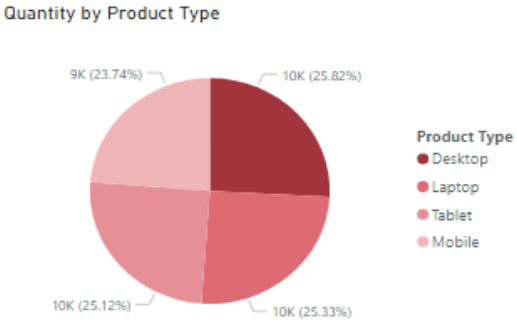




2) This is a **Stacked Column Chart** displaying **Quantity by Owner.**

In **Axis** section of Visualizations, **Owner** and in **Values section, Quantity** is placed.

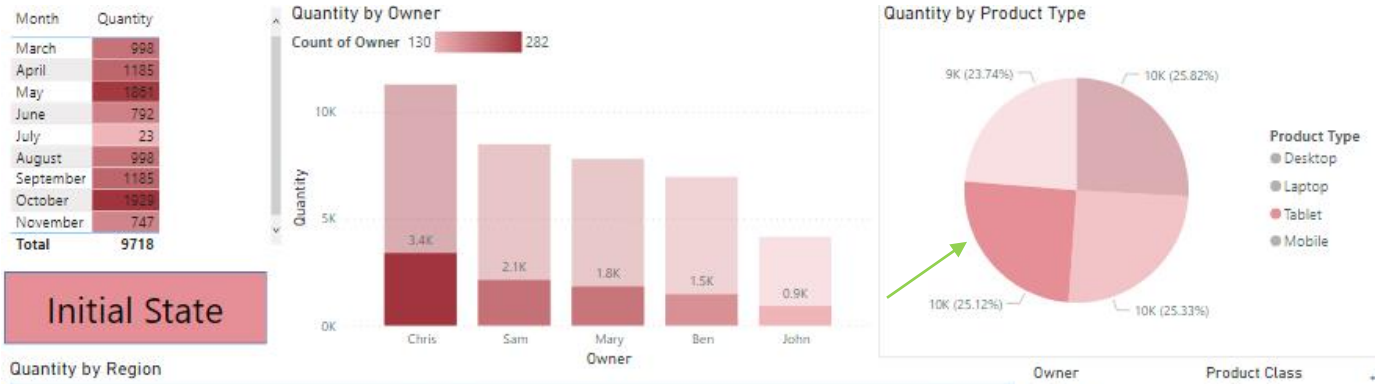
This is how other content will get affected if we focus only on Ben:

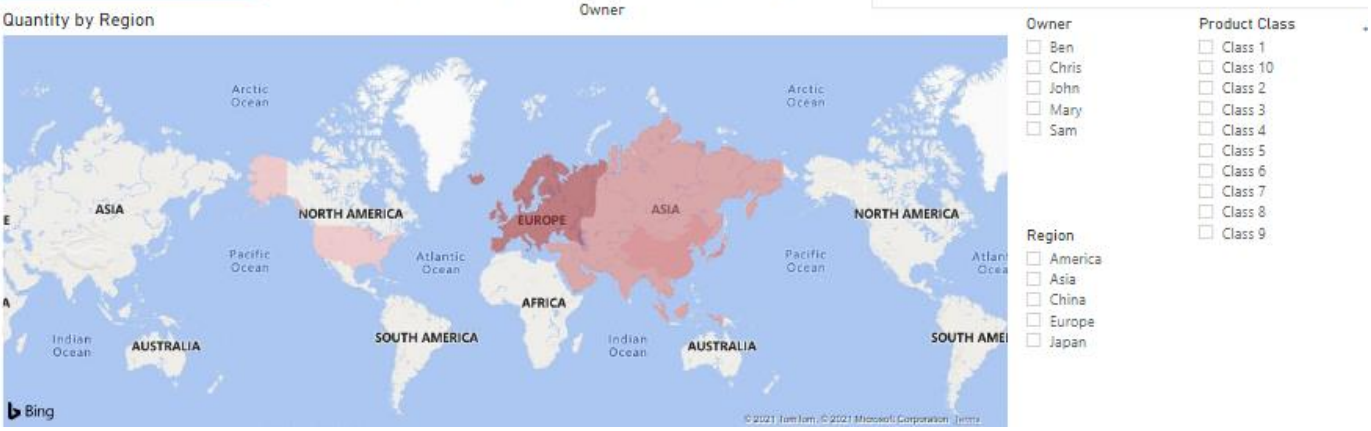


This is a **Pie Chart** displaying **Quantity by Product Type.**

In **Legend** section of Visualizations, **Product Type** is placed and in **Values** section, **Quantity** is placed.

This is how other content will get affected if we focus only on Tablet:

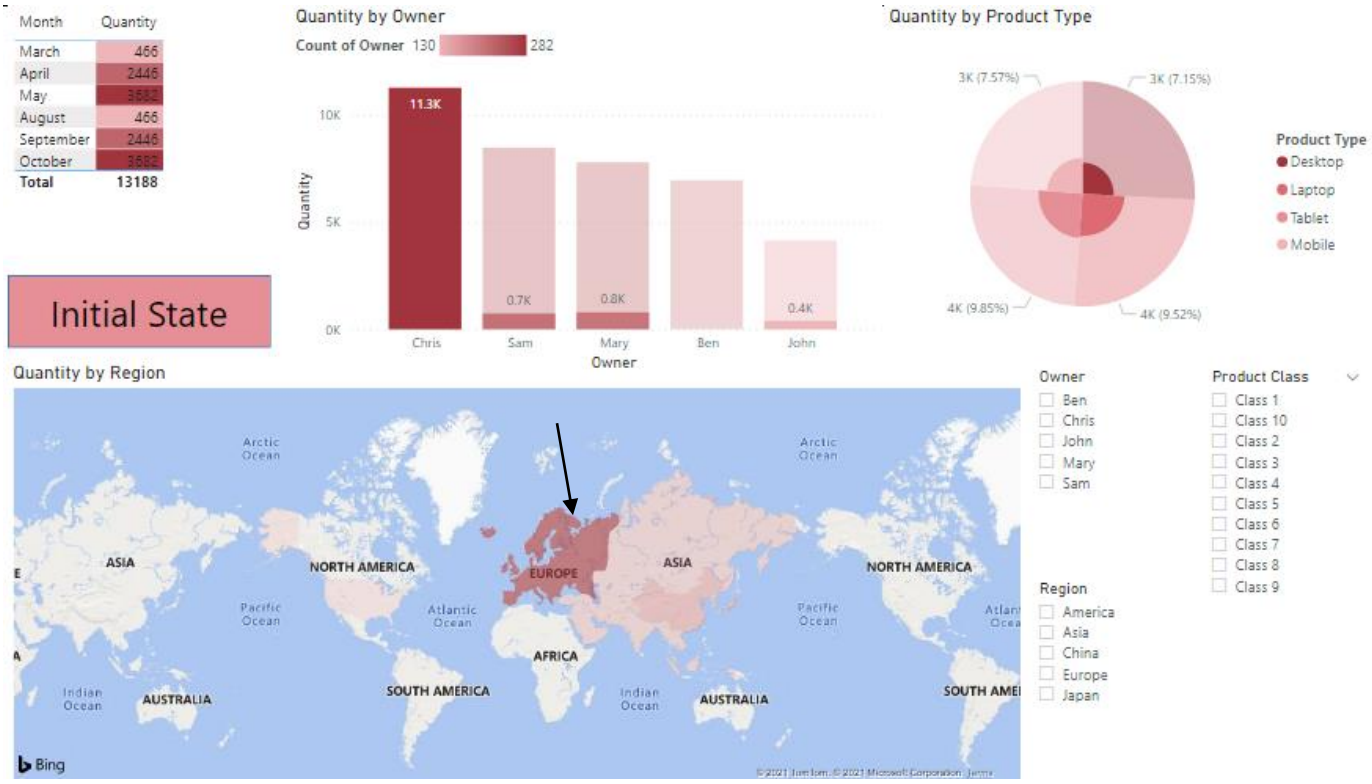


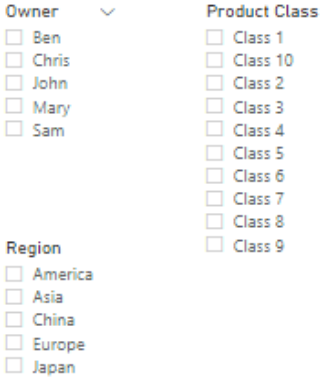


3) This is a **Filled Map** that displays **Quantity by Region.**

In **Location** section of Visualizations, **Region** is placed and in **Tooltips** section, **Quantity** is placed.

This is how other content will get affected if we focus only on Europe:

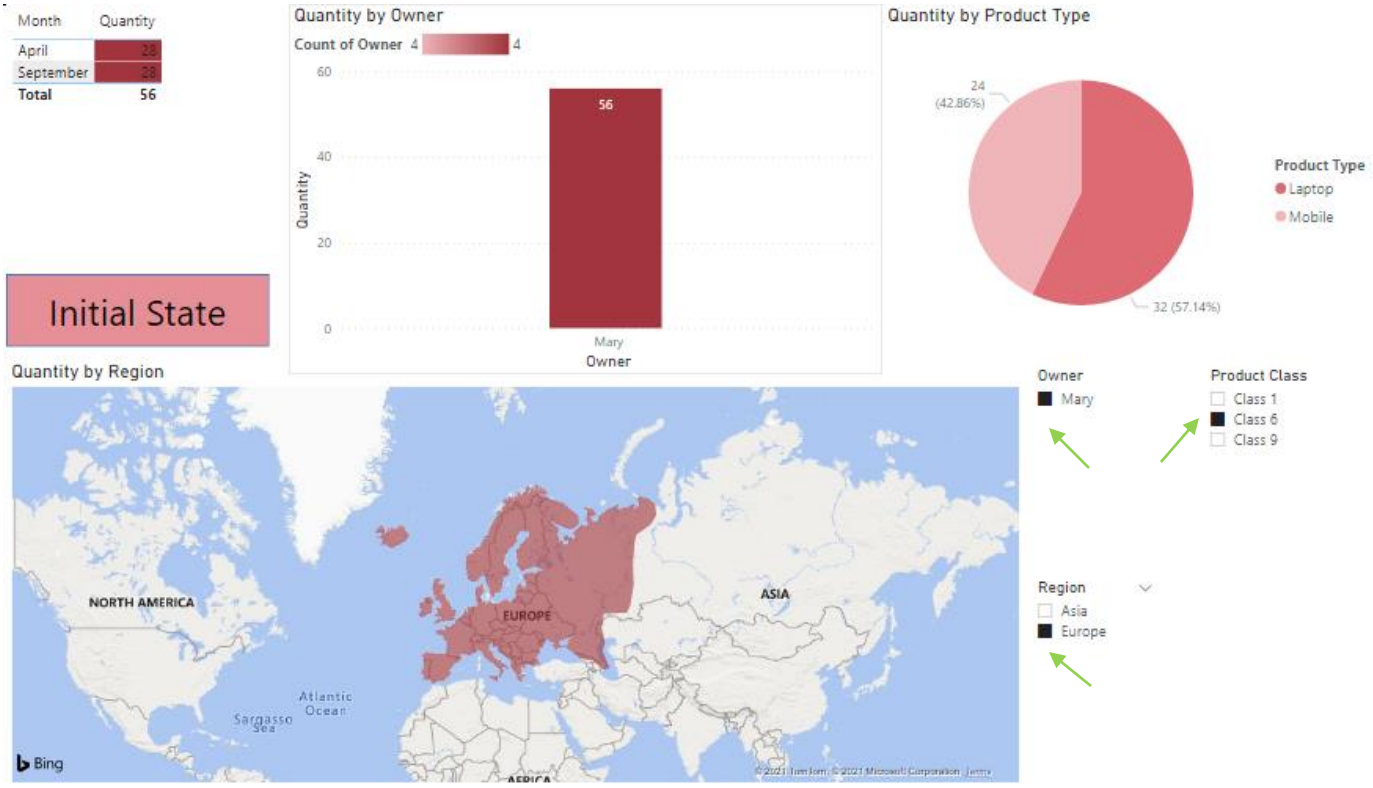




<u>4)</u> These are **Slicers** that provides options to select among **Owners, Product Classes** and **Regions**.

In **Field** section of Visualizations, **Owner, Region** and **Product Class** are placed.

This is how other content will get affected if we select Mary as an owner, Europe as region and Class 6 as a Product Class:



Initial State

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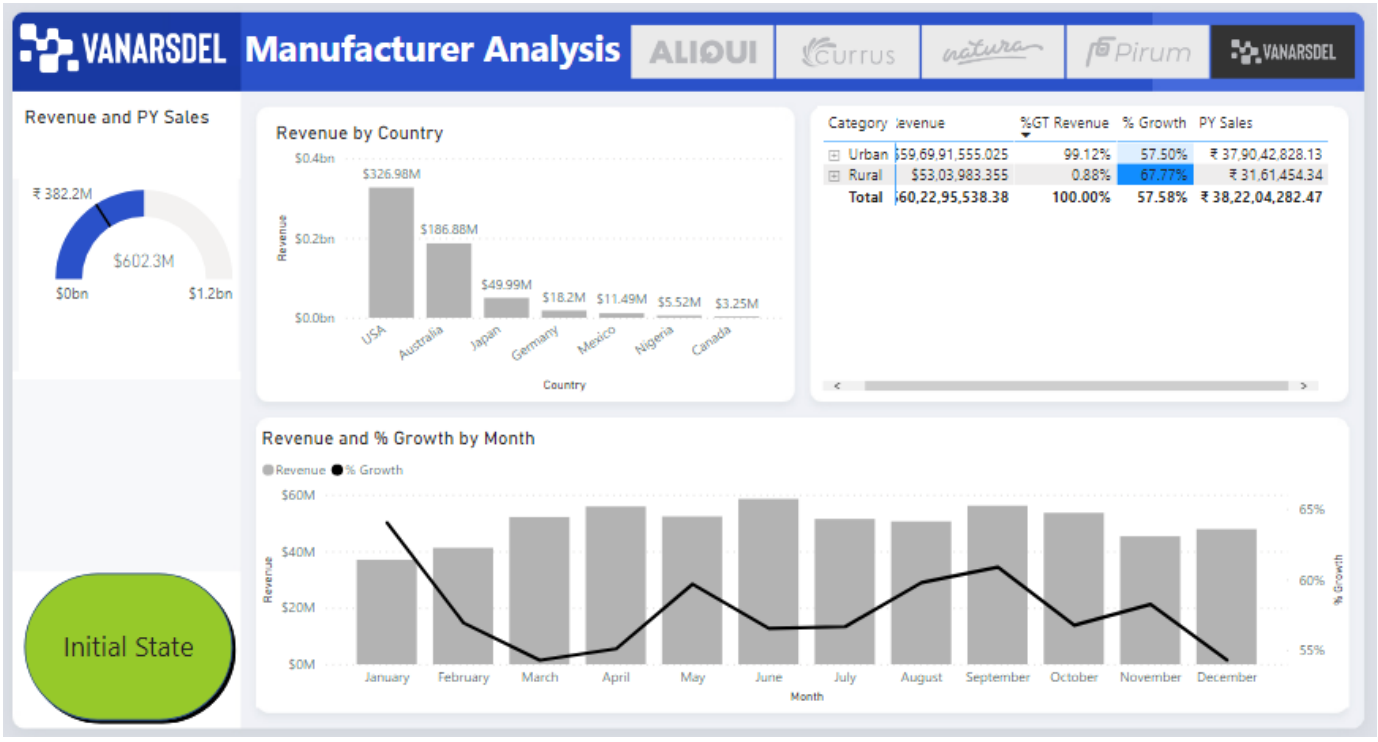
DASHBOARD 3



To create this dashboard, we have these 5 tables and their columns:

i. Date
   - Date

ii. Geography
   - Zip
   - City
   - State
   - Region
   - District
   - Country
   - ZipCountry

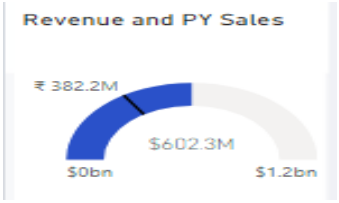
iii. Manufacturer
   - Manufacturer ID
   - Manufacturer
   - Logo
   - Manufacturer (groups)

iv. Product
   - Product ID
   - Category
   - Product
   - Segment
   - MSRP
   - Currency

v. Sales
   - Product ID
   - Date

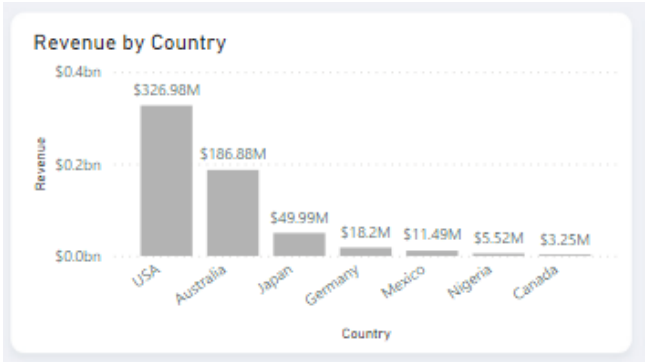
- Zip
- Units
- Revenue
- Country
- ZipCountry

Now, let us get into the details of the content of this dashboard:



1) This is a **Gauge** which is used to display **Revenue and PY Sales.**

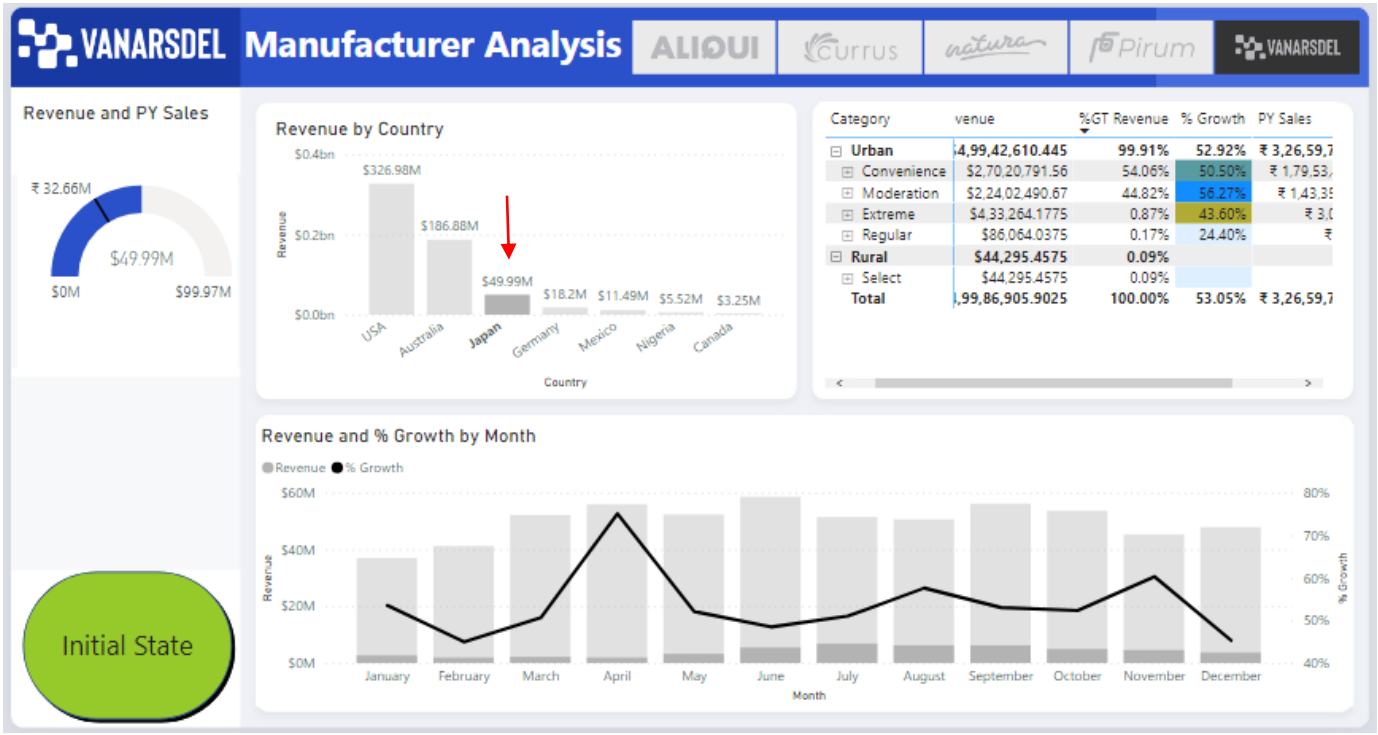
In **Value** section of Visualizations, **Revenue** is placed.
In **Target Value** section of Visualizations, **PY Sales** is placed.

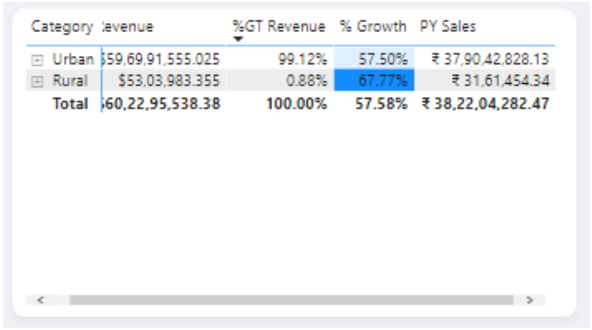


2) This is a Stacked Column Chart which is used to display Revenue by Country.

In **Axis** section of Visualizations, **Country, State** and **District** are placed.
In **Values** section of Visualizations, **Revenue** is placed.

This is how other content will get affected if we focus only on Japan in this chart:

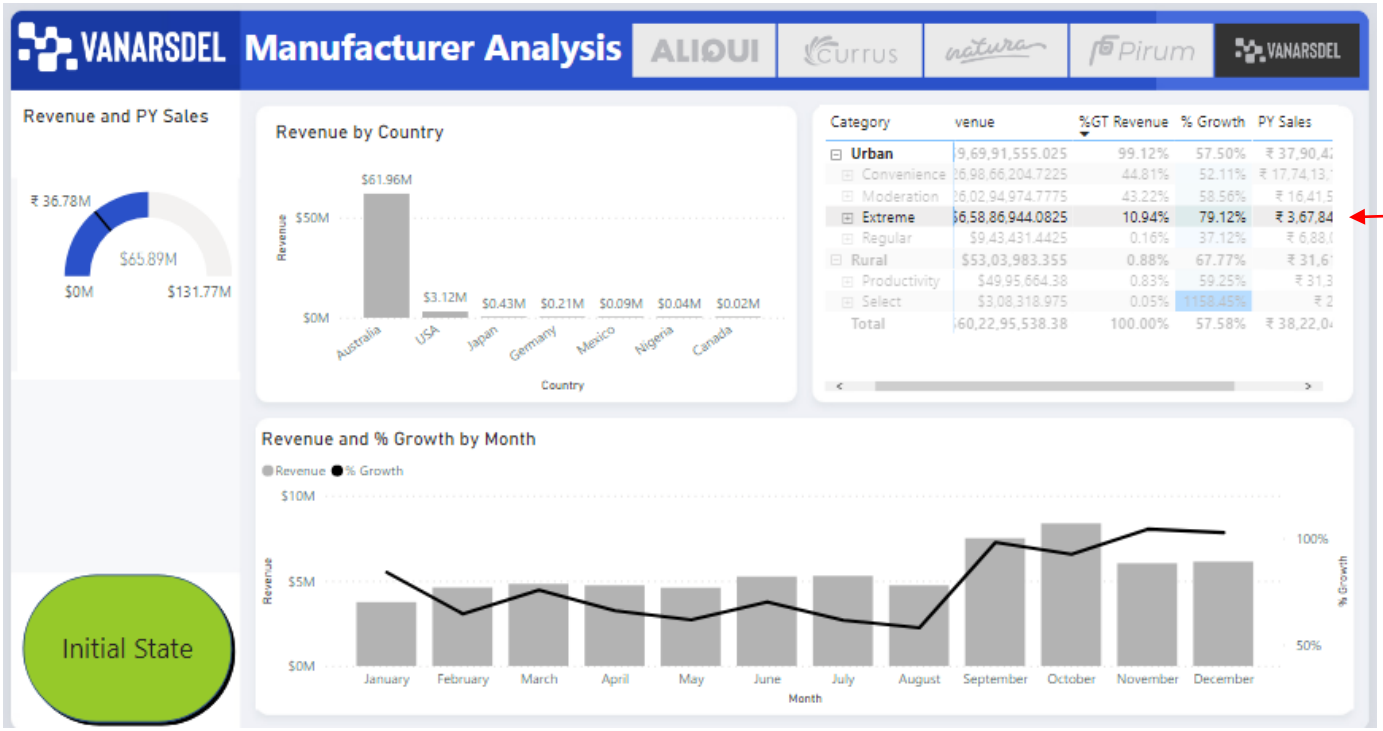




3) This is a **Matrix** used to display Categories such as **Urban, Rural, Youth** and **Mix.**

It displays and contains hierarchy of **Category, Segment** and **Product** and contains values as **Revenue, % GT Revenue, % Growth** and **PY Sales.**

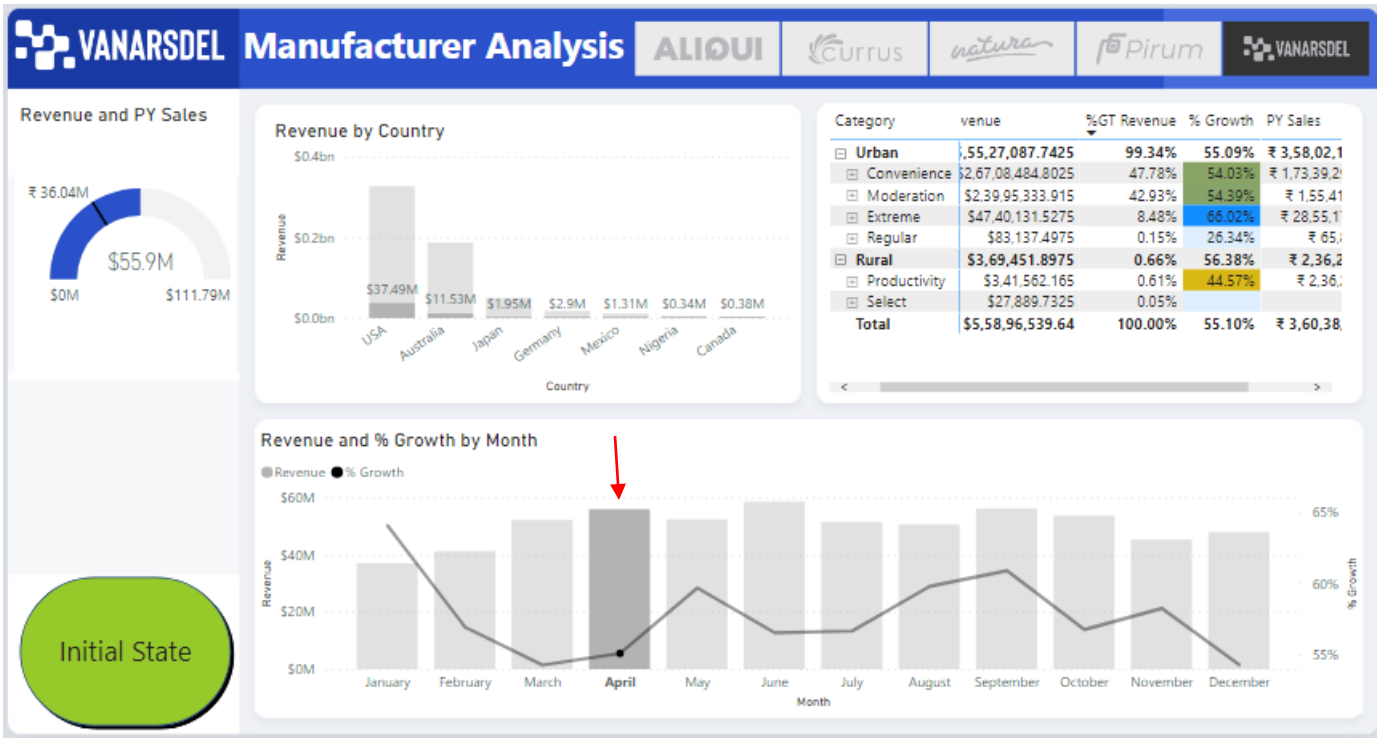
This is how other content will get affected if we focus only on Extreme under Urban in this matrix:



4) This is **Line and Clustered Column Chart** which displays **Revenue and % Growth by Month**.

In **Shared Axis** section of Visualizations, **Date (Year, Quarter, Month, Day)** is placed.
In **Column Values and Line Values** sections of Visualizations, **Revenue and % Growth** are placed respectively.

This is how other content will get affected if we focus only on April in this chart:

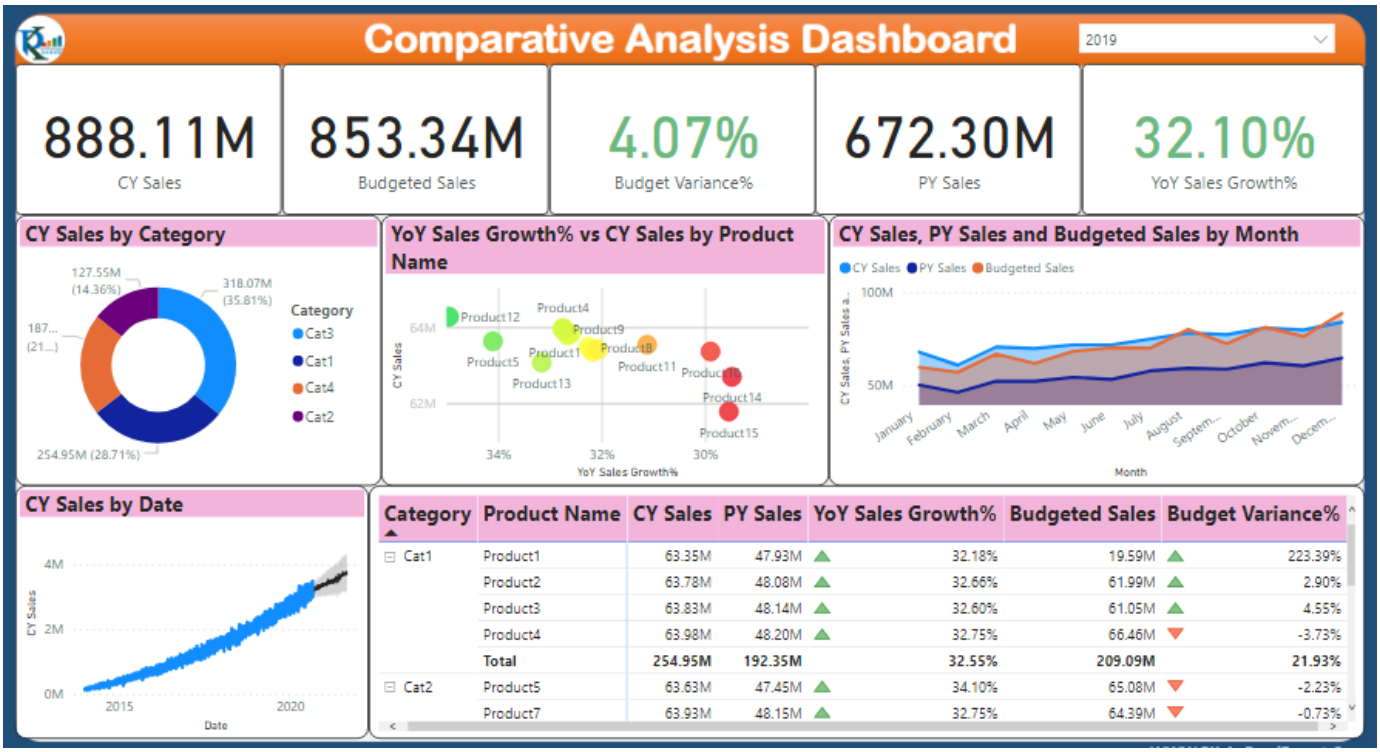


5) This is a slicer which displays companies' logos.

In **Fields** section of Visualizations, **Logo** is placed.
This is how other content will get affected if we focus only on Natura in this slicer:

6) This is button created using ‘Shapes’ which will take us to the initial state of the dashboard by pressing **‘Ctrl + Click’**. Create a **bookmark** at initial state and set it as an **Action** in the shape.

DASHBOARD 4



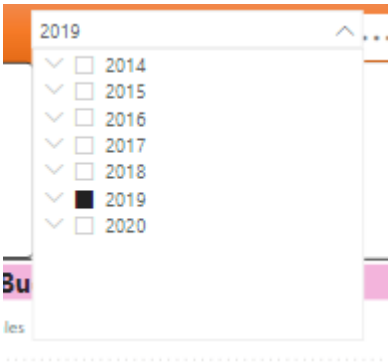
To create this dashboard, we have these 4 tables and their columns:

i. Budget
   - Month
   - ProductId
   - Budgeted Amt

ii. Date Dimension
   - Date
   - Year
   - Month
   - Qtr
   - Month No.

iii. Product Master
   - ProductId
   - Product Name
   - Category

iv. Sales
   - Date
   - ProductId
   - Sale Amount

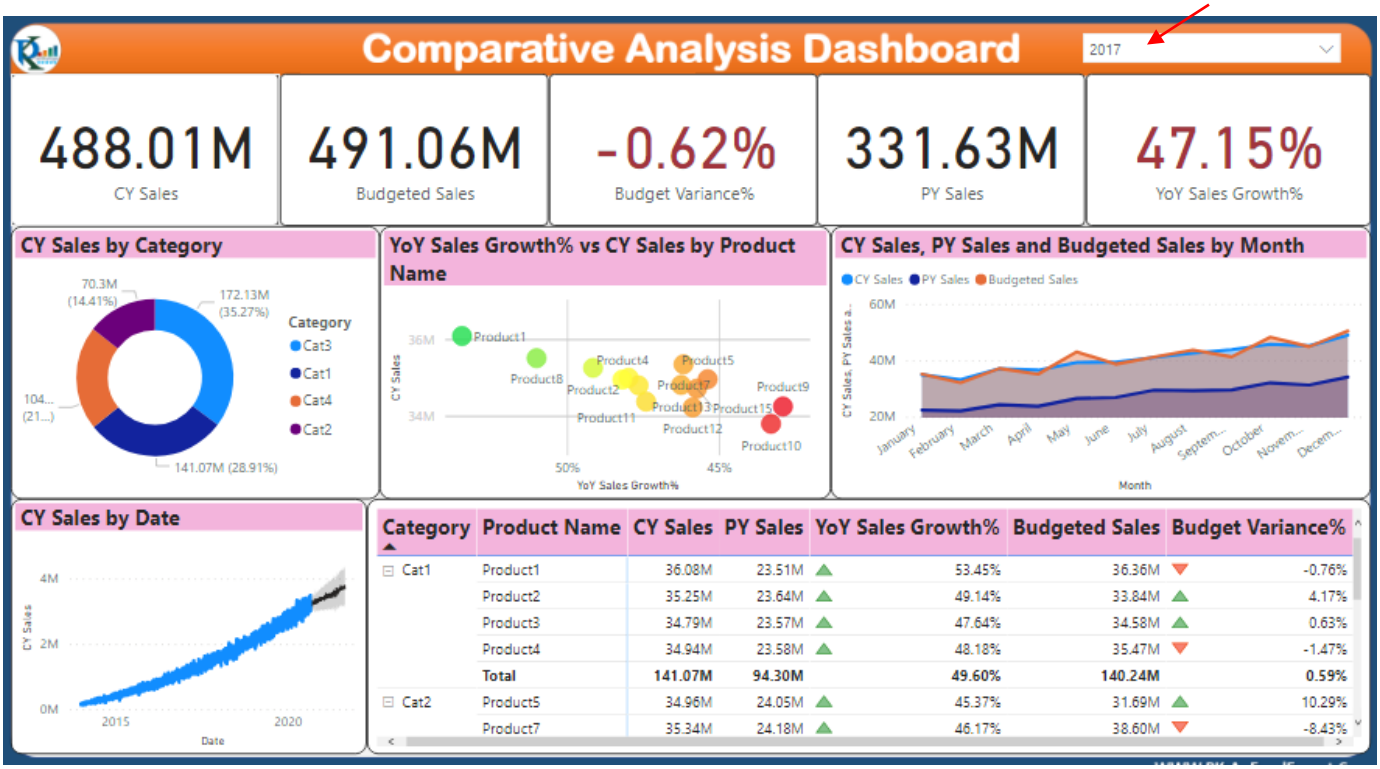


Now, let us get into the details of the content of this dashboard:

1) This is a **drop-down slicer** used for selecting which year's data needs to be shown.

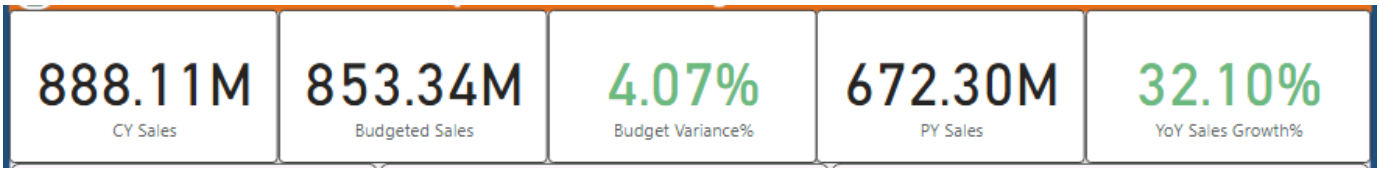
In the **Field** section of Visualizations, **Year**, **Qtr** and **Month** are placed.

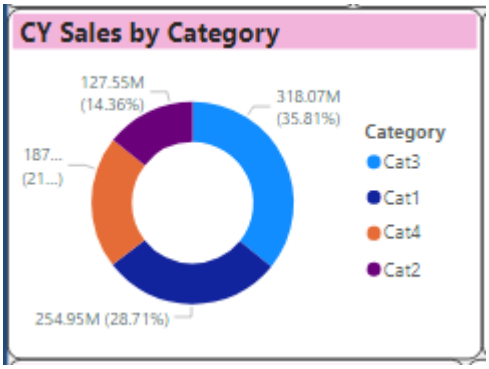
Here is how every other content will change just by changing the year from 2019 to 2017:



2) These are 5 different **Cards** used for displaying various values:

- CY Sales: **Field** section in Visualizations is occupied by **CY Sales.**
- Budgeted Sales: **Field** section in Visualizations is occupied by **Budgeted Sales.**
- Budget Variance %: **Field** section in Visualizations is occupied by **Budget Variance %.** Loss will be displayed by red font and profit will be displayed by green font
- PY Sales: **Field** section in Visualizations is occupied by **PY Sales.**
- YoY Sales Growth %: **Field** section in Visualization is occupied by **YoY Sales Growth %.** Loss will be displayed by red font and profit will be displayed by green font

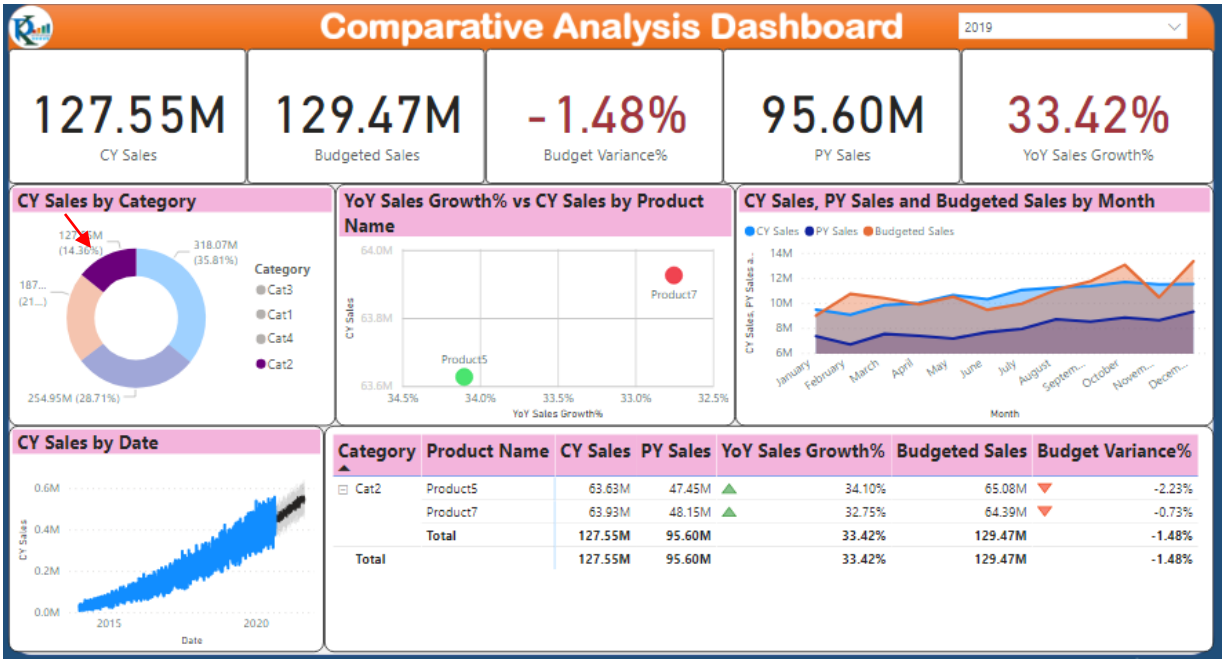


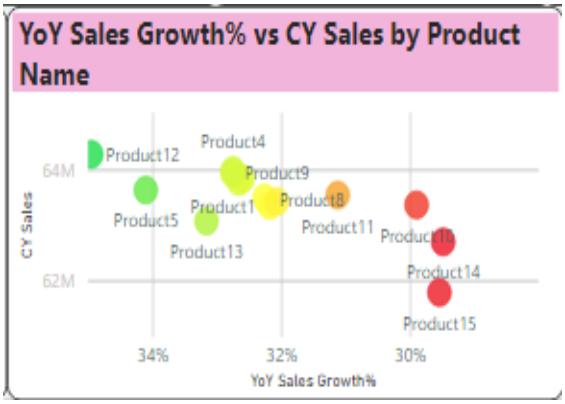


3) This is a **Donut Chart** used to display **CY Sales by Category.**

In the **Legend** section of Visualizations, **Category** is placed.
In the **Values** section of Visualizations, **CY Sales** is placed.

Here is how every other content will change just by focusing on Cat2 of Donut Chart:

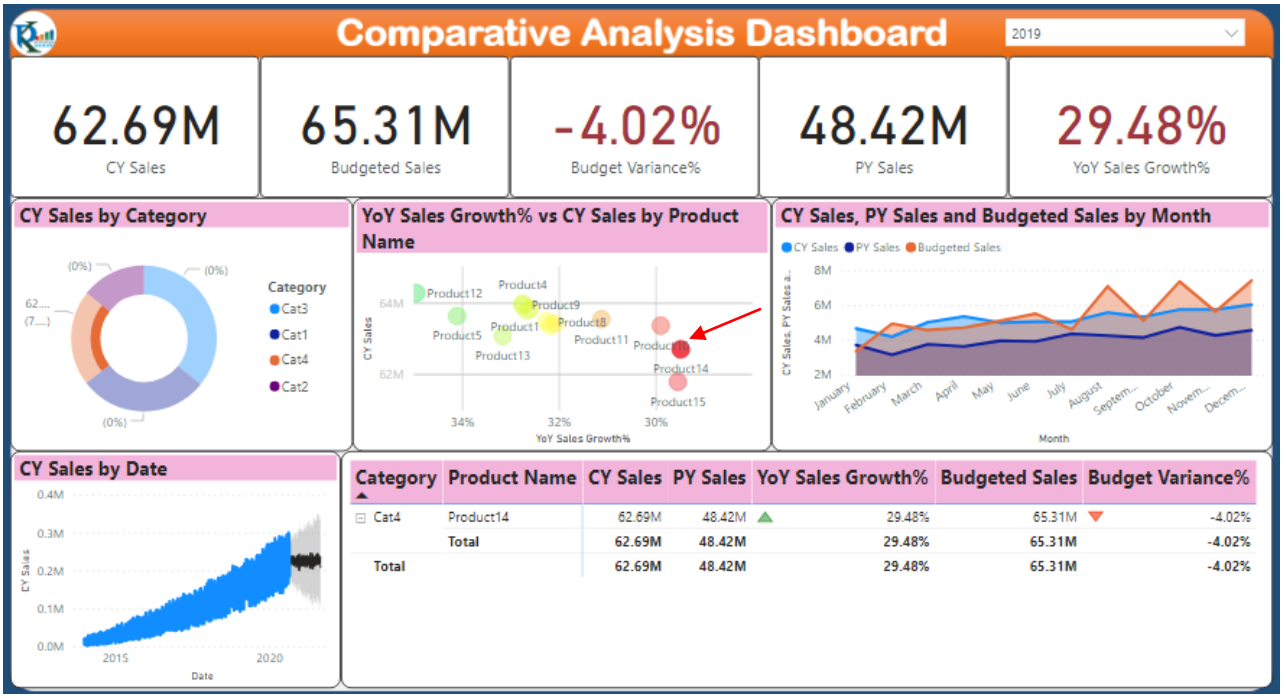


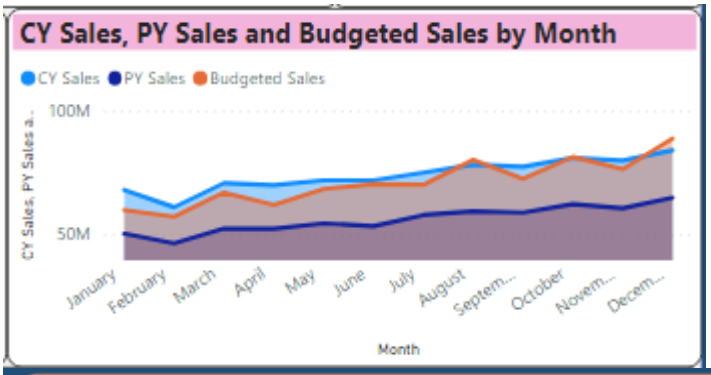


4) This is a **Scatter Chart** used to display **YoY Sales Growth % vs CY Sales by Product Name**.

In the **Details** section of Visualizations, **Product Name** is placed.
In the **X Axis** section of Visualizations, **YoY Sales Growth %** is placed.
In the **Y Axis** section of Visualizations, **CY Sales** is placed.

Here is how every other content will change just by focusing on Product14 of Scatter Chart:

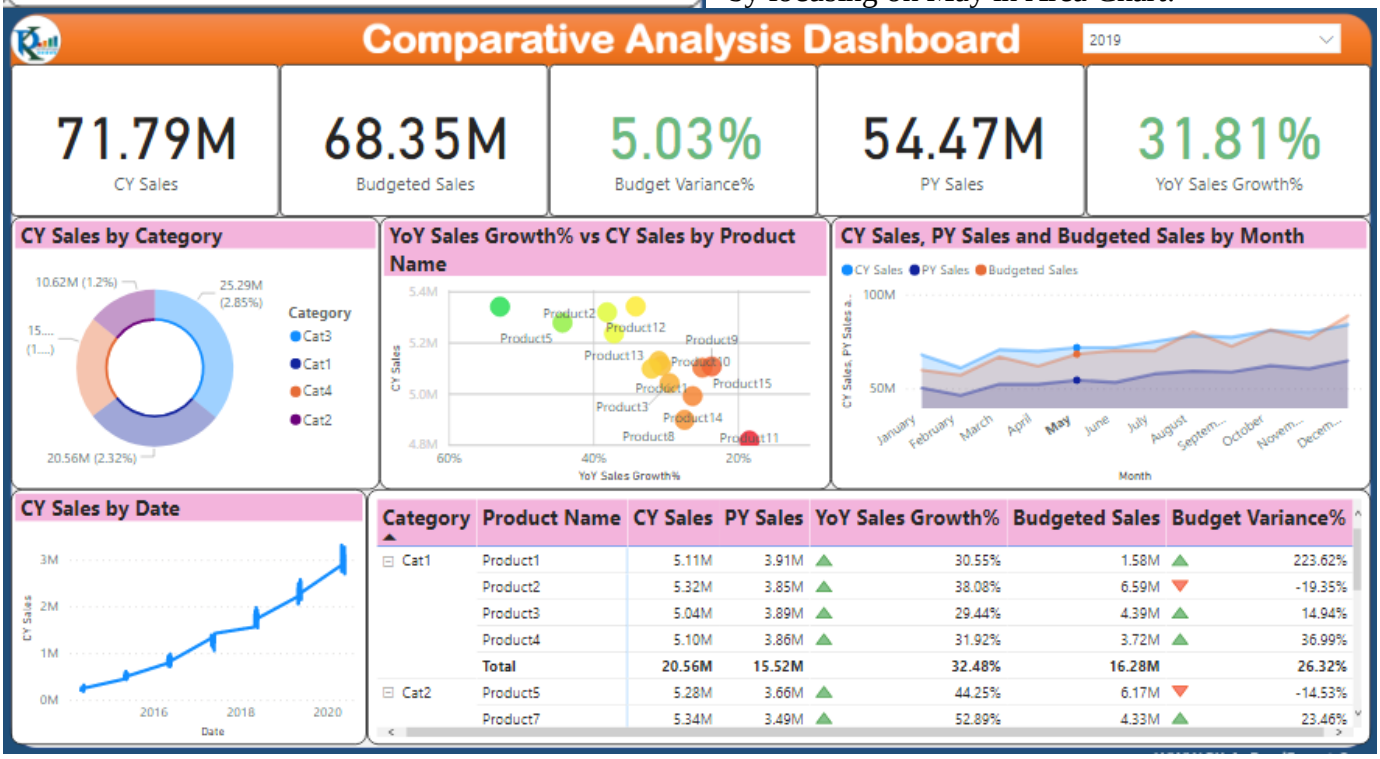


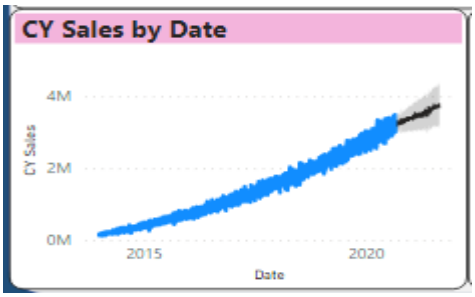


5) This is an **Area Chart** used to display **CY Sales, PY Sales and Budgeted Sales by Month**.

In the **Axis** section of Visualizations, **Month** is placed.
In the **Values** section of Visualizations, **CY Sales, PY Sales** and **Budgeted Sales** are placed.

Here is how every other content will change just by focusing on May in Area Chart:

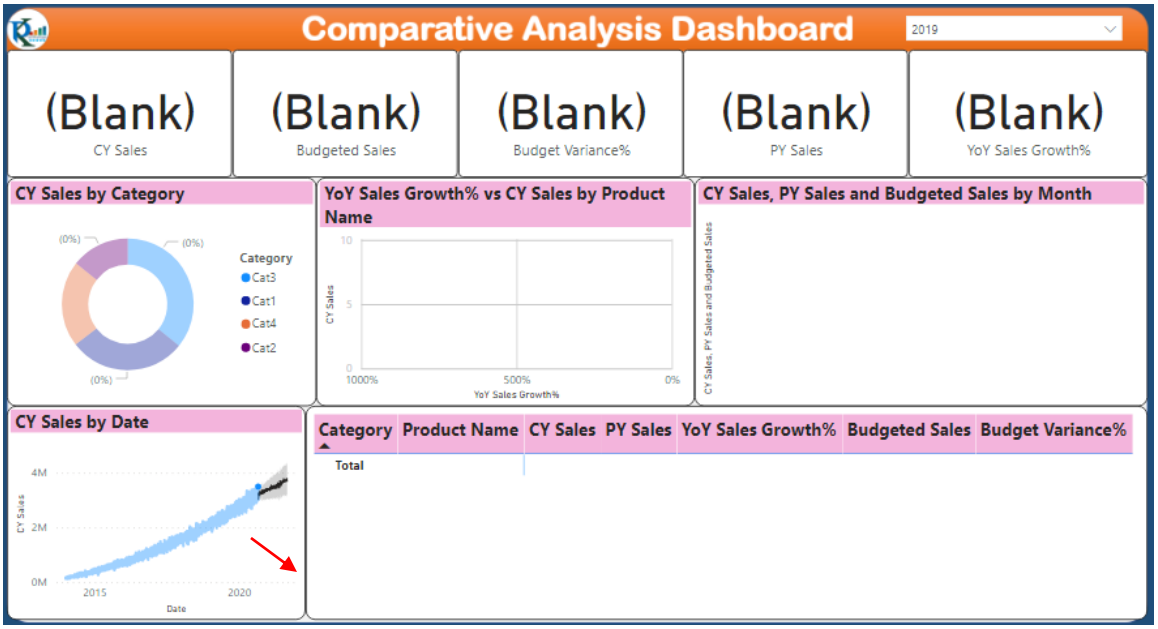




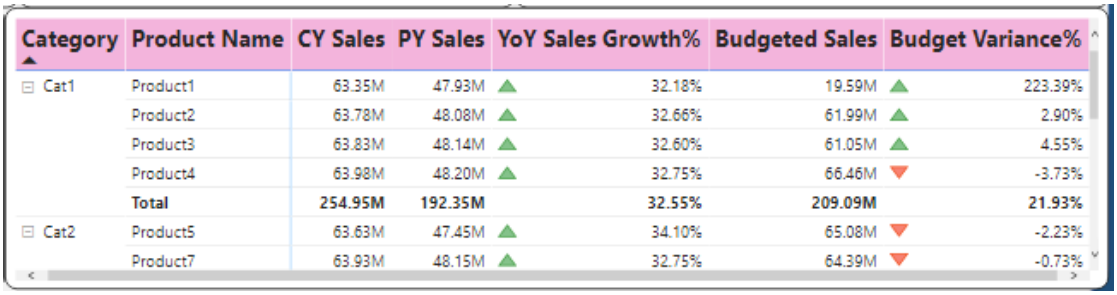
6) This is a **Line Chart** used to display **CY Sales by Date**.

In the **Axis** section of Visualizations, **Date** is placed.
In the **Values** section of Visualizations, **CY Sales** is placed.
There is no filter according to year slicer.

Here is how every other content will change just by focusing on a year other than 2019 in Line Chart:

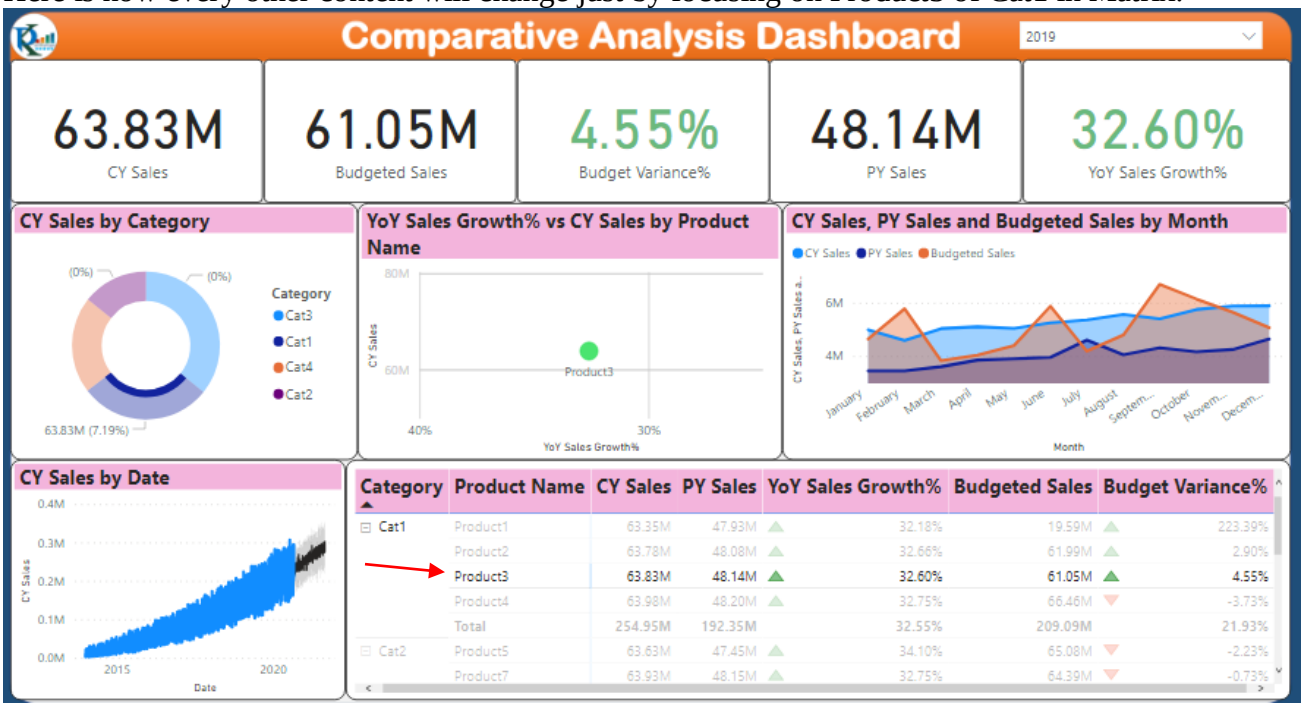


7) This is a **Matrix** containing 4 categories. It displays **Category, Product Name, CY Sales, PY Sales, YoY Sales Growth %, Budgeted Sales** and **Budget Variance %.**

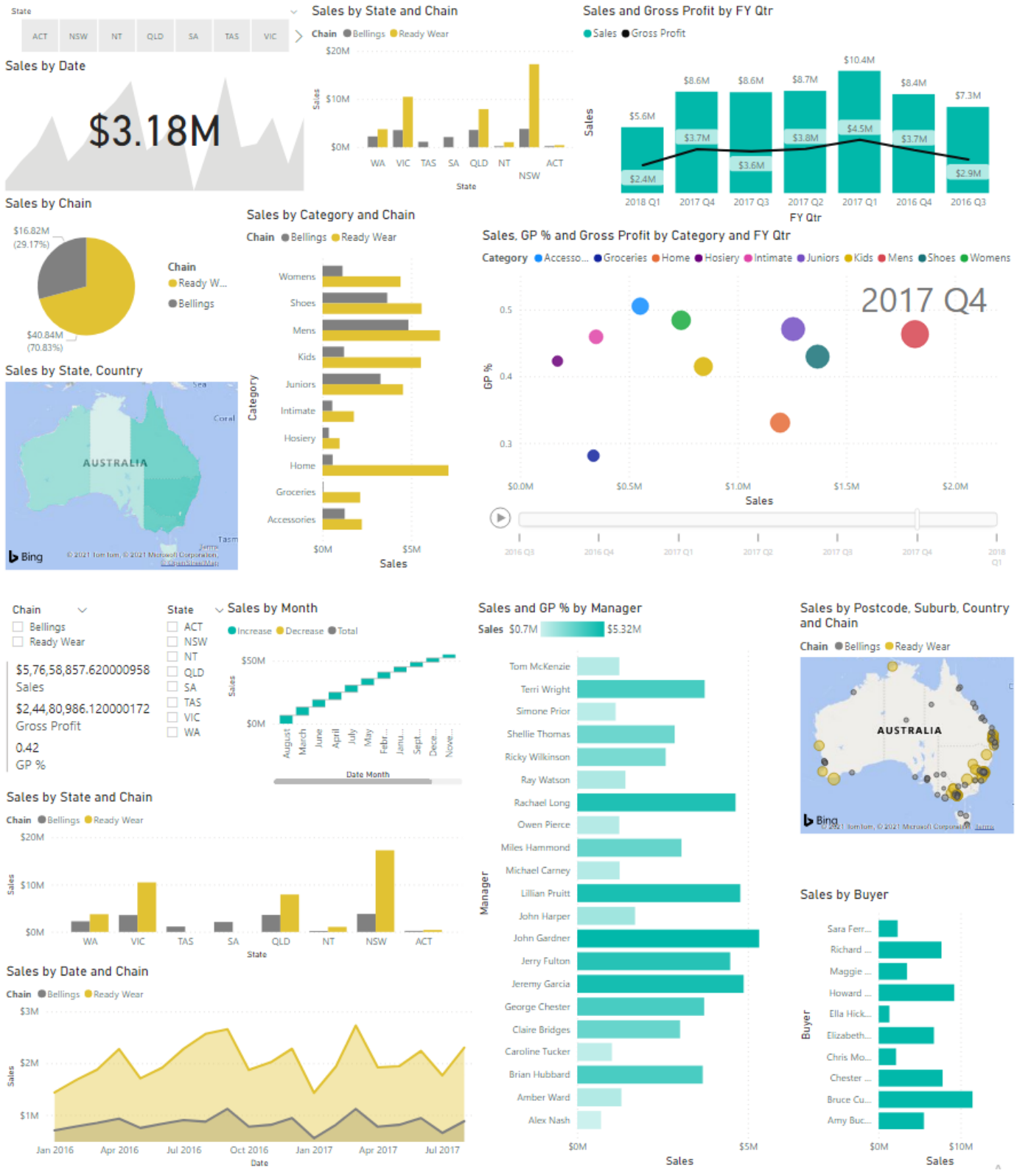


Category	Product Name	CY Sales	PY Sales	YoY Sales Growth%	Budgeted Sales	Budget Variance%
Cat1	Product1	63.35M	47.93M	32.18%	19.59M	223.39%
	Product2	63.78M	48.08M	32.66%	61.99M	2.90%
	Product3	63.83M	48.14M	32.60%	61.05M	4.55%
	Product4	63.98M	48.20M	32.75%	66.46M	-3.73%
	Total	**254.95M**	**192.35M**	**32.55%**	**209.09M**	**21.93%**
Cat2	Product5	63.63M	47.45M	34.10%	65.08M	-2.23%
	Product7	63.93M	48.15M	32.75%	64.39M	-0.73%

Here is how every other content will change just by focusing on Product3 of Cat1 in Matrix:



DASHBOARD 5



To create these 2 dashboards, we have these 5 tables and their columns:

i. Buyers
   - Category

- Buyer

ii. Dates
- Date
- Financial Year
- FY Qtr
- FY Month

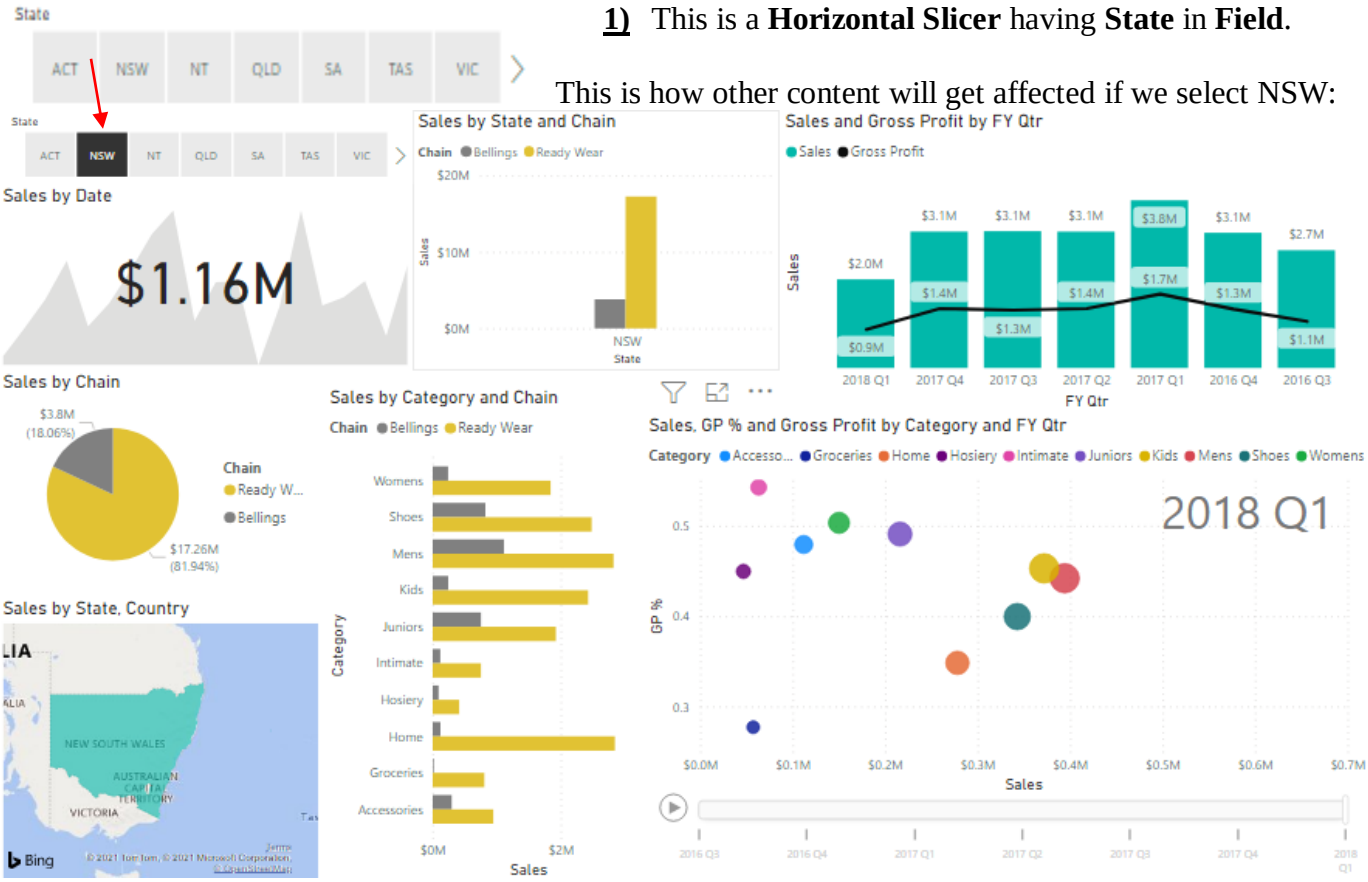
iii. Managers
- Suburb
- Postcode
- Manager

iv. Regions
- State
- Suburb
- Postcode
- State, Country
- Postcode, Suburb, Country

v. Sales
- Date
- Chain
- Postcode
- Category
- Total Units
- Sale Price
- Cost Price
- Sales
- Cost
- Gross Profit

Now, let us get into the details of the content of these dashboards:

DASHBOARD 5A: SUMMARY

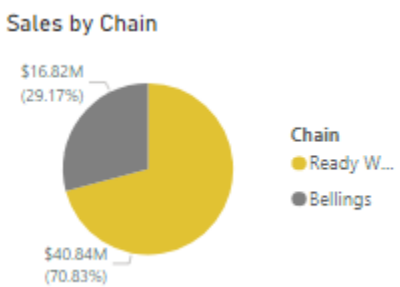


1) This is a **Horizontal Slicer** having **State** in **Field**.

This is how other content will get affected if we select NSW:

2) This is **KPI** that shows us **Sales by Date**.

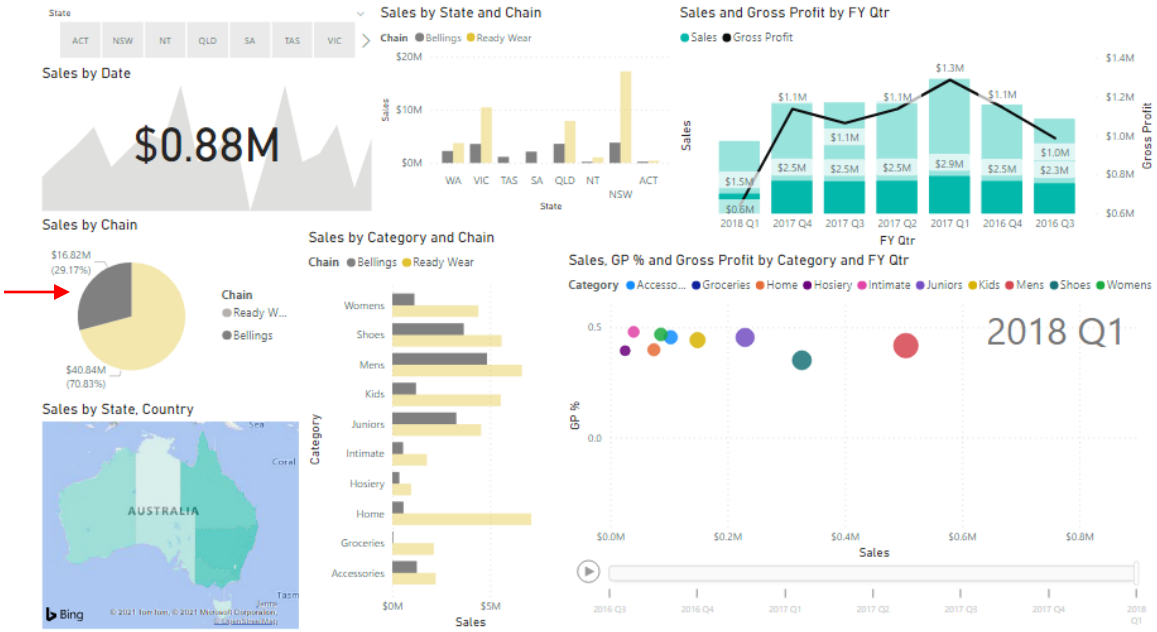
It has **Sales** in **Indicator** and **Date** in **Trend Axis** in Visualizations section.



3) This is a **Pie Chart** which shows us **Sales by Chain**.

It has **Chain** in **Legend** and **Sales** in **Values** in Visualizations section.

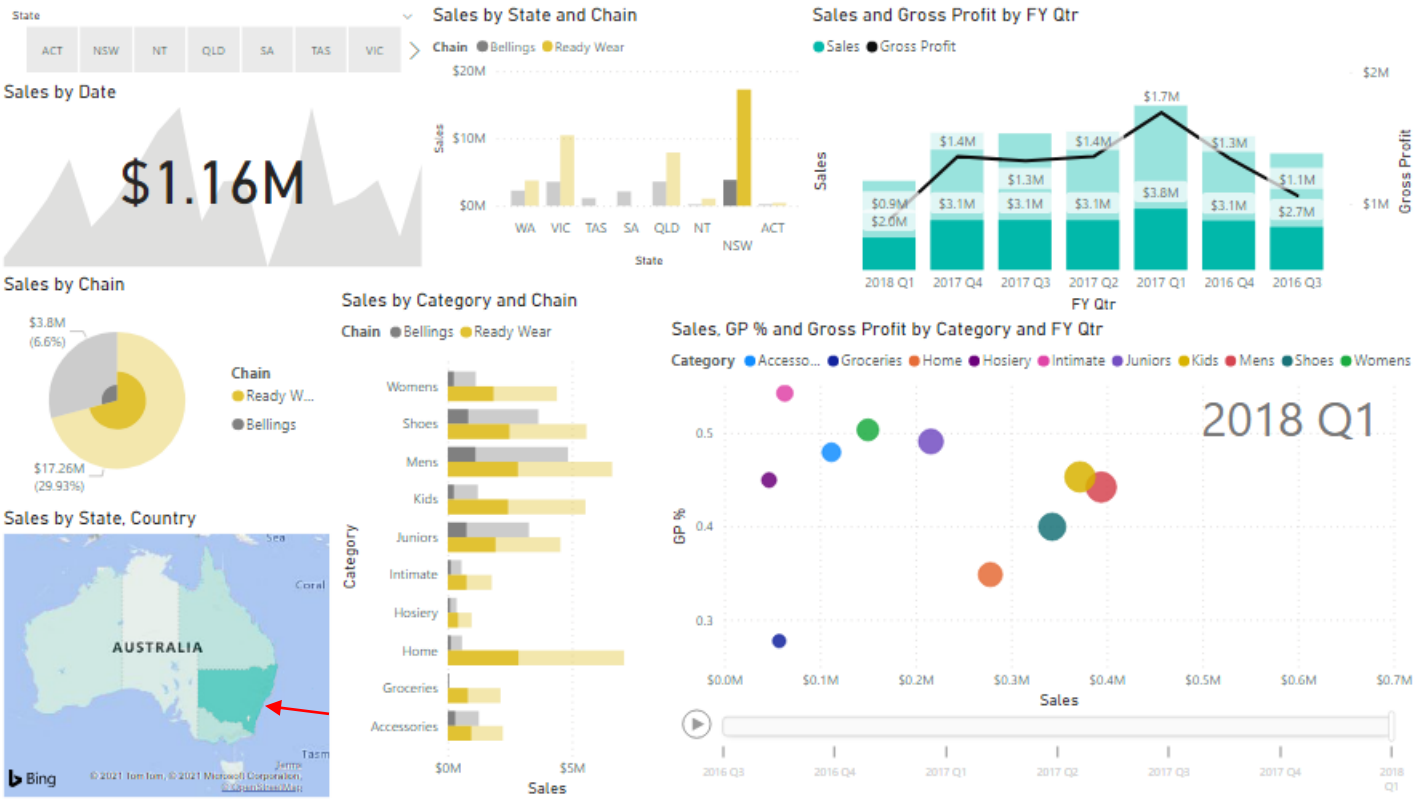
This is how other content will get affected if we select Bellings:

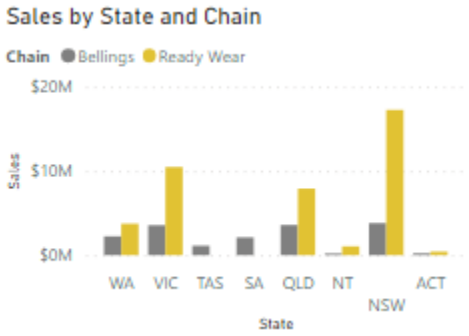


4) This is a **Filled Map** which shows us **Sales by State and Country.**

It has **State** and **Country** in **Location** and **Sales** in **Tooltip** in Visualizations section.

This is how other content will get affected if we select this region:

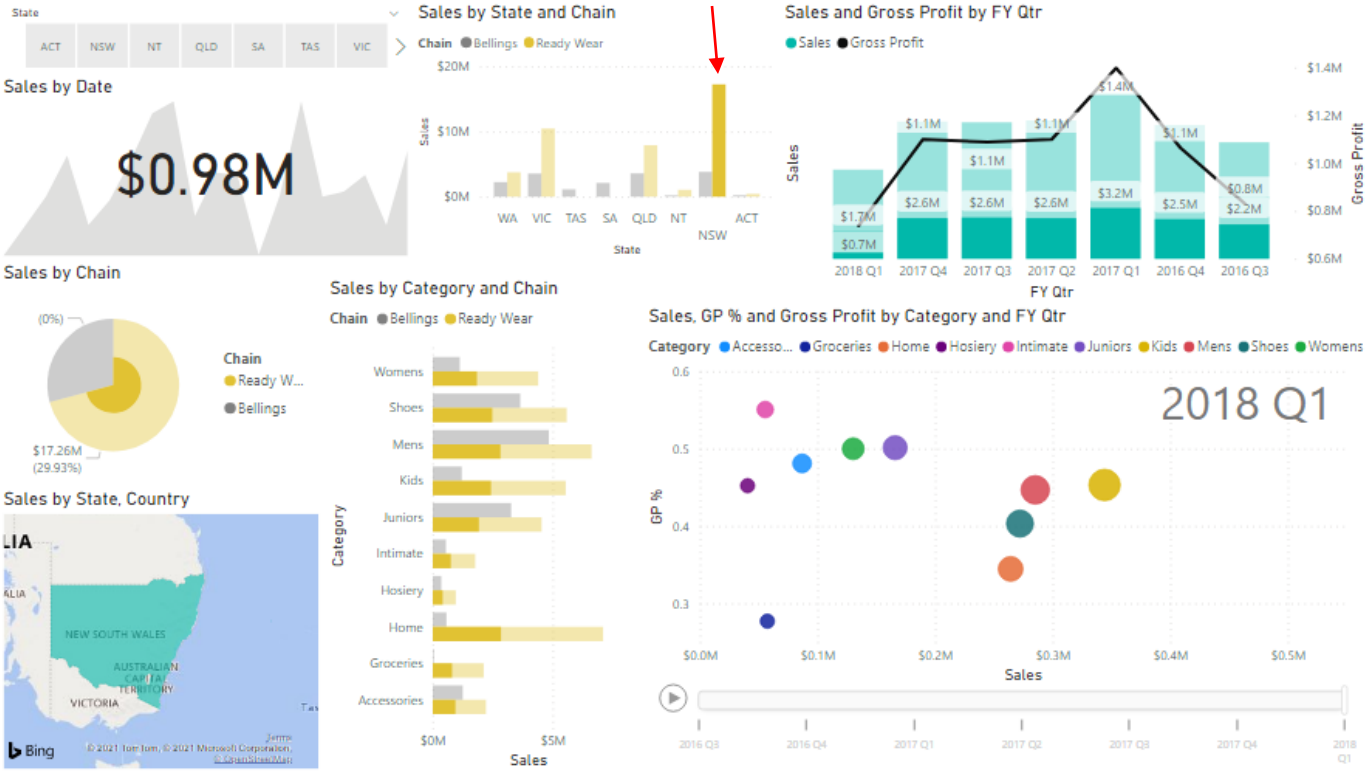


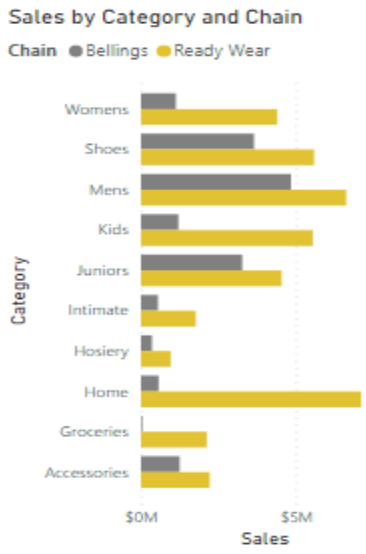


5) This is a **Clustered Column Chart** which displays **Sales by State and Chain.**

It has **State** in **Axis**, **Chain** in **Legend** and **Sales** in **Values** in Visualizations section.

This is how other content will get affected if we select Ready Wear in NSW:

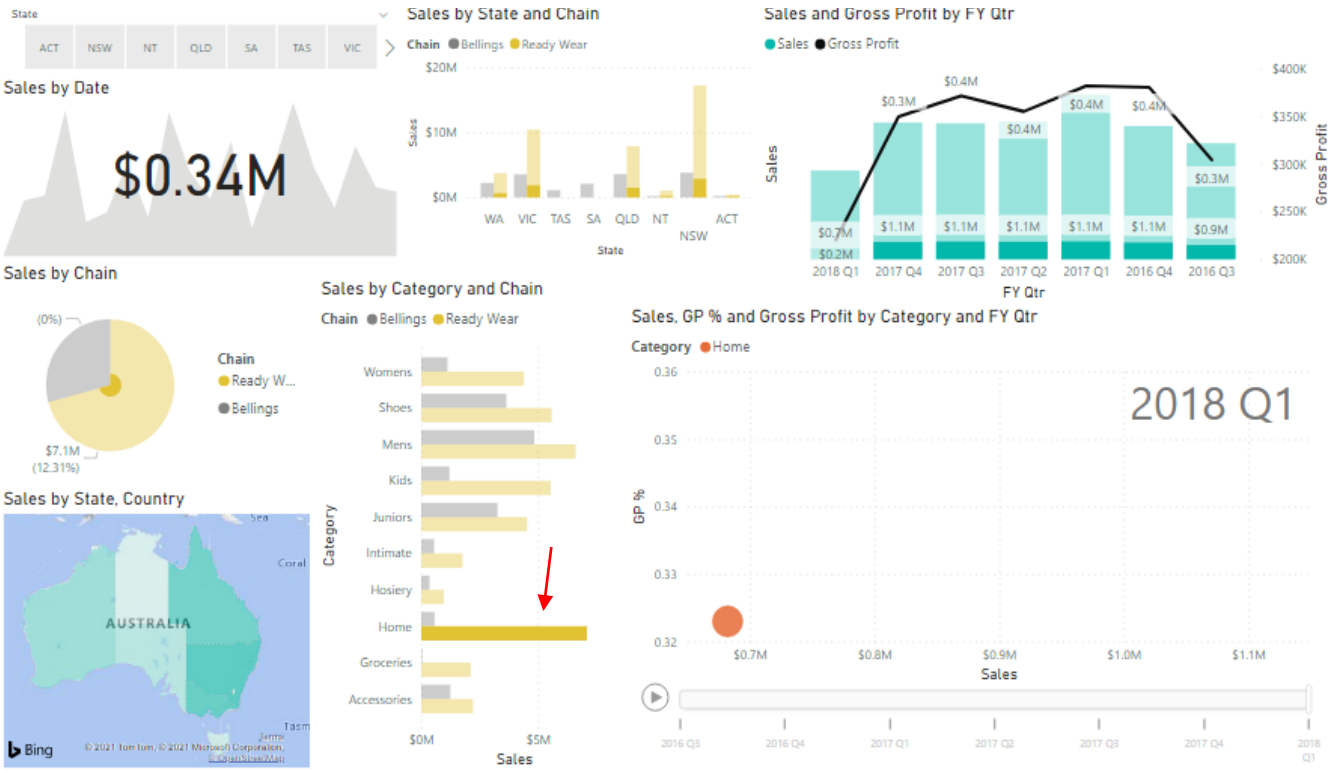


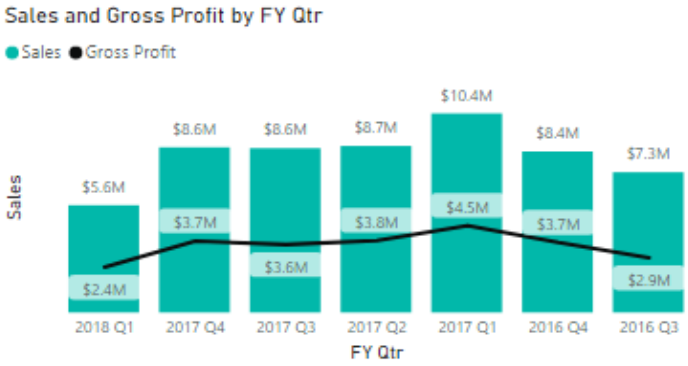


6) This is a **Clustered Bar Chart** which displays **Sales by Category and Chain.**

It has **Category** in **Axis**, **Chain** in **Legend** and **Sales** in **Values** in Visualizations section.

This is how other content will get affected if we select Ready Wear in Home:

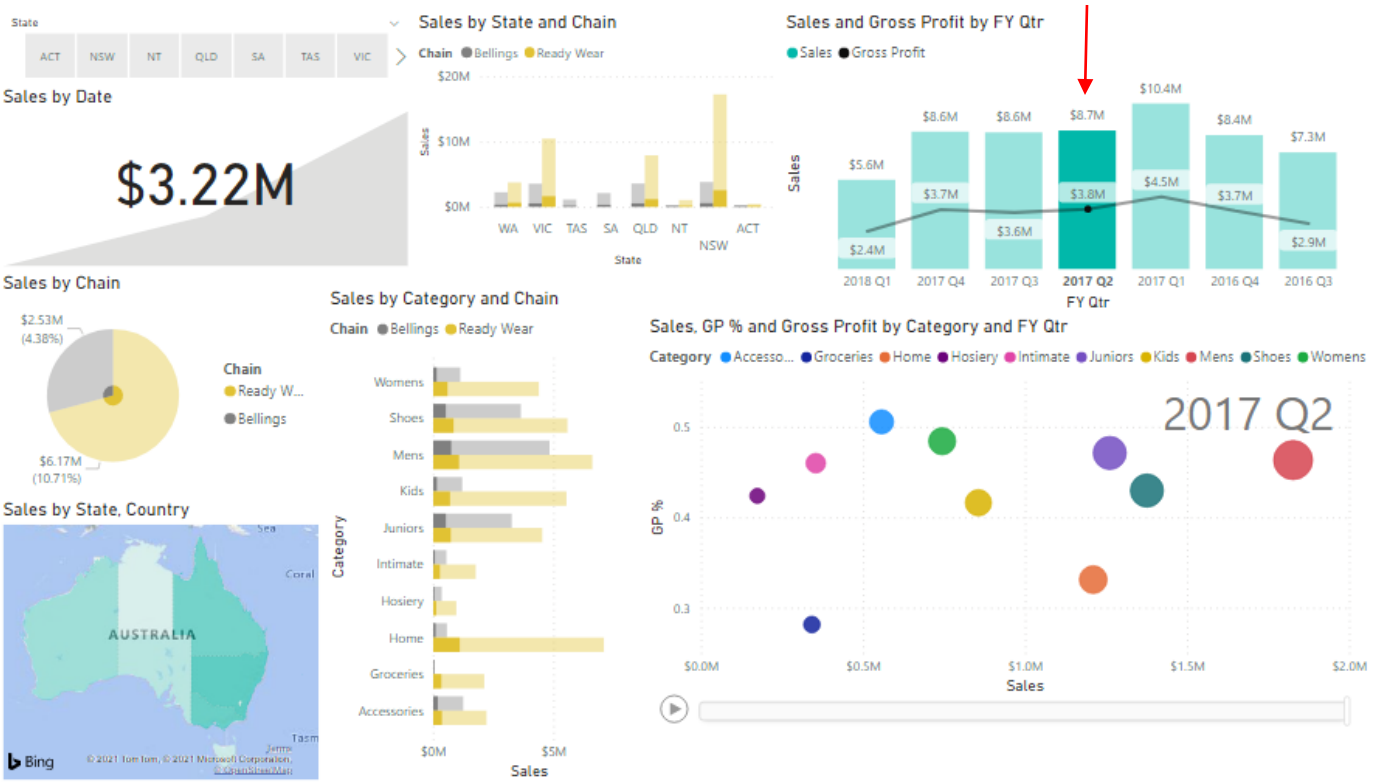


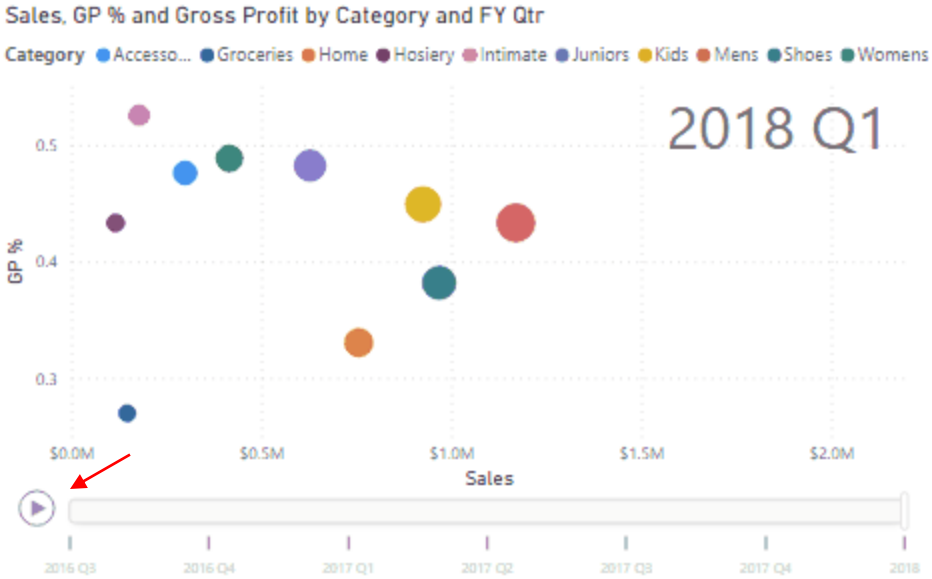


7) This is a **Line and Clustered Column Chart** which **shows Sales and Gross Profit by FY Qtr.**

It has **FY Qtr** in **Shared Axis**, **Sales** in **Column Values** and **Gross Profit** in **Line Values** in Visualizations section.

This is how other content will get affected if we select 2017 Qtr2:



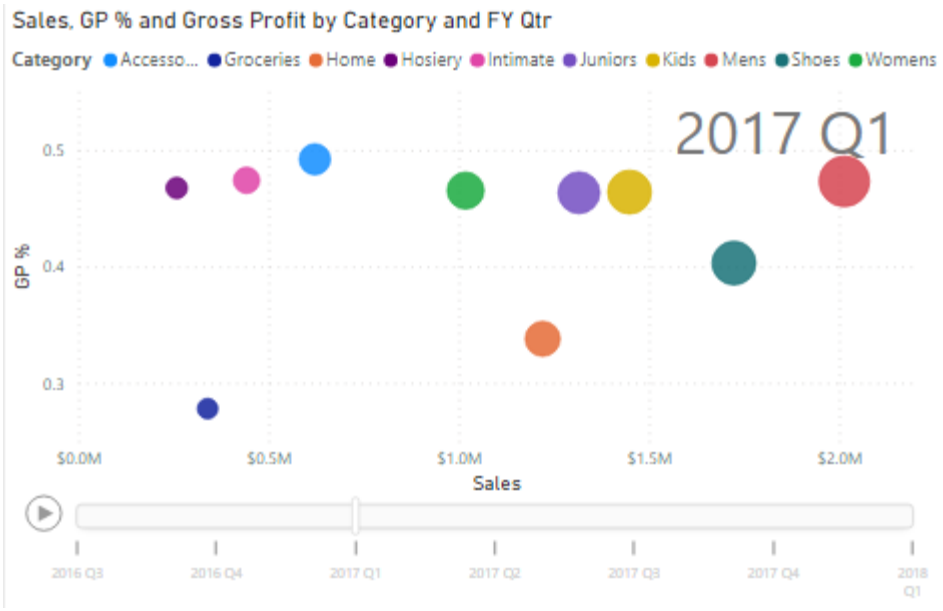


8) This is a Scatter Chart showing Sales, GP% and Gross Profit by Category and FY Qtr.

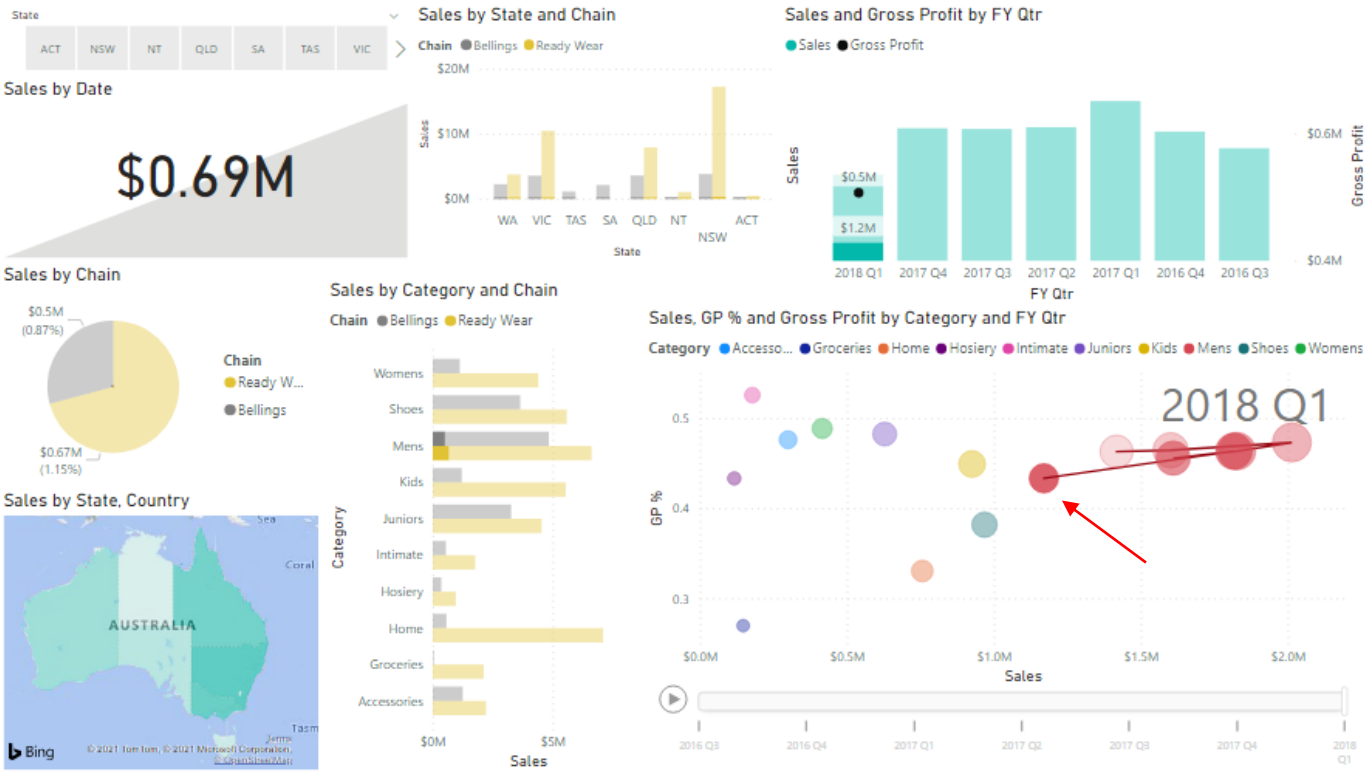
It has **Category** in **Legend, Sales** in **X Axis**, and **GP %** in **Y Axis, Gross Profit** in **Size** and **FY Qtr** in **Play Axis** in Visualizations section.

By clicking on this Play button, the bubbles start to move and hence, create a motion.

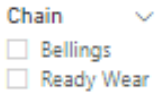
This is what it looks like after some motion:



This is how other content will get affected if we select Men:

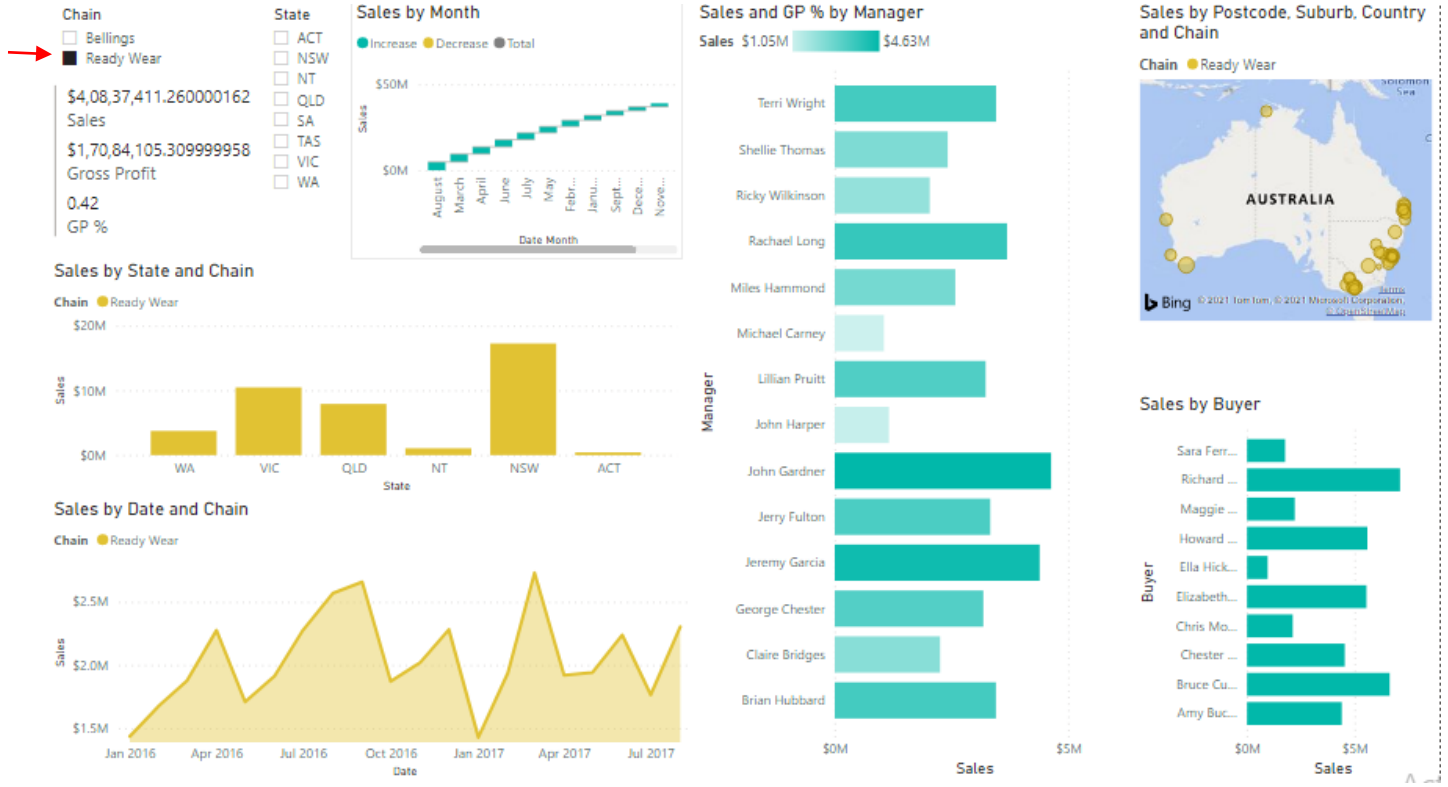


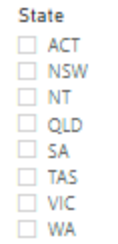
DASHBOARD 5B: REGIONS AND CHAINS



1) This is a **Slicer** displaying **Chain** and it has **Chain** as its **Field.**

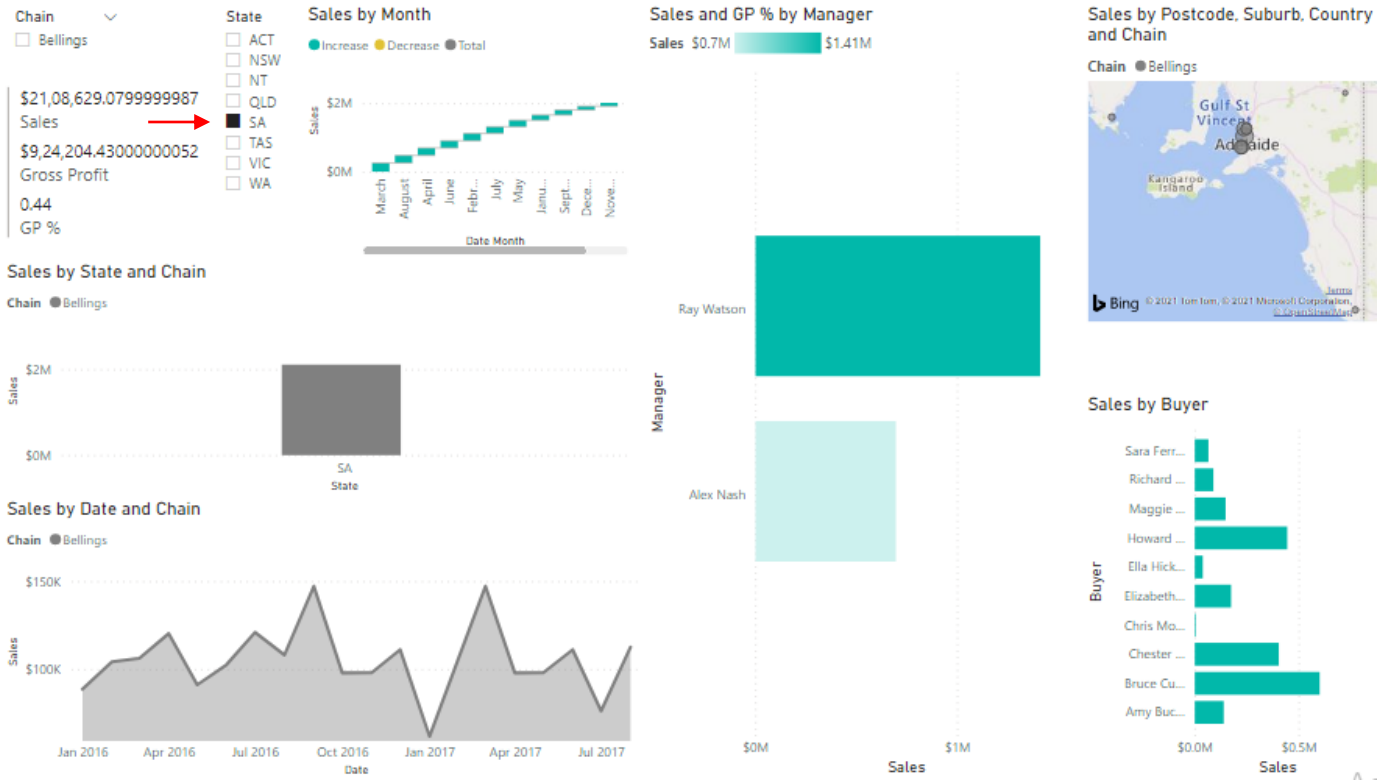
This is how other content will get affected if we select Bellings or Ready Wear:

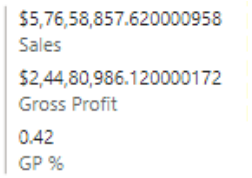




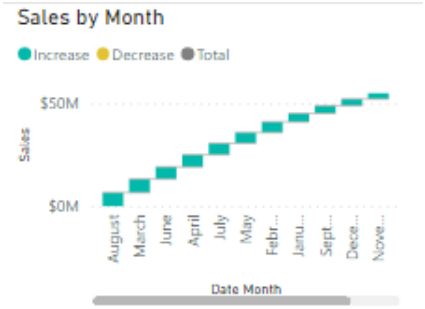
2) This is a **Slicer** displaying **State** and it has **State** as its **Field**.

This is how other content will get affected if we select SA as State:





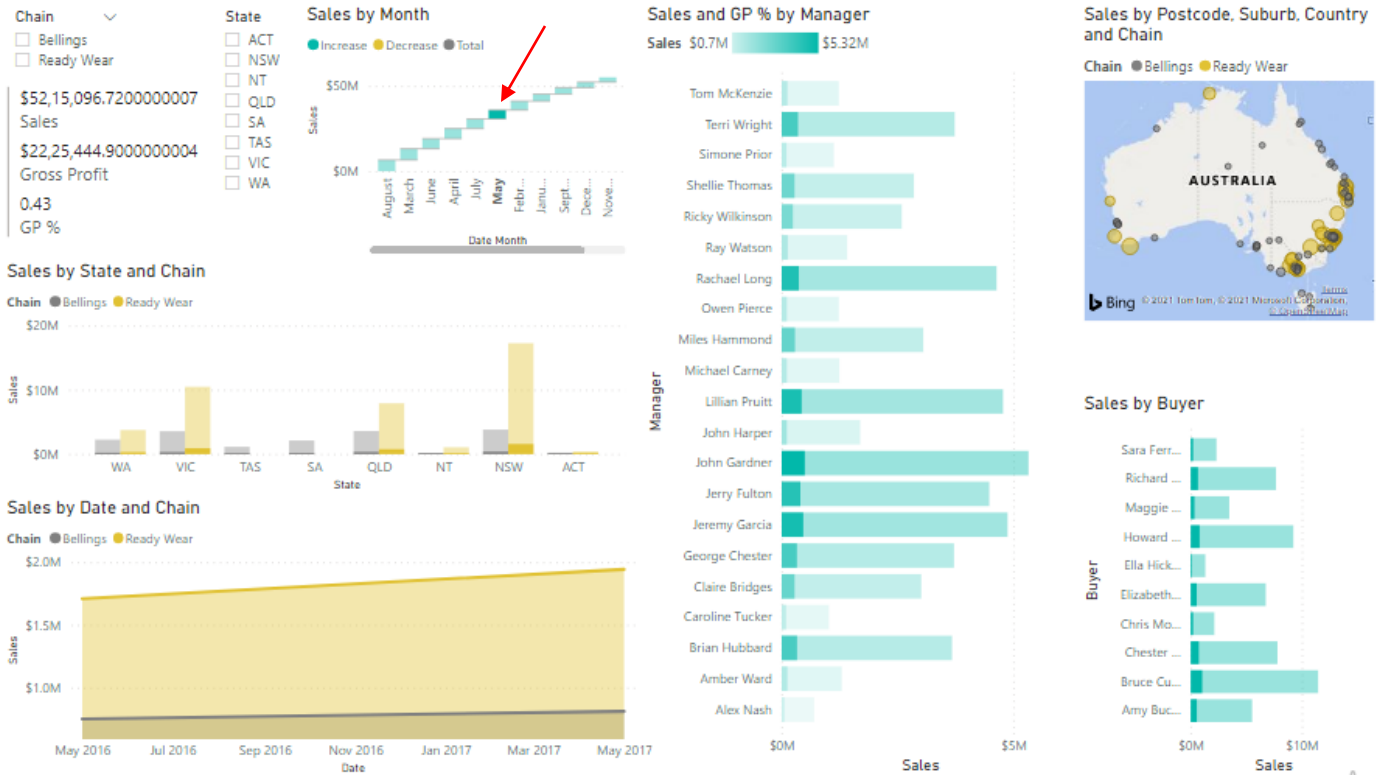
3) This is a **Multi-row Card** showing **Sales, Gross Profit** and **GP %** and has them as **Fields** as well.

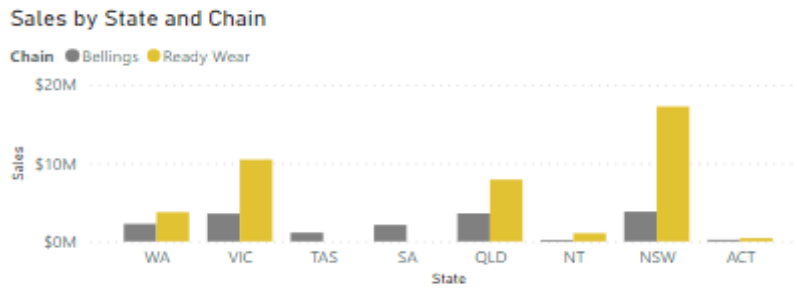


4) This is a **Waterfall Chart** showing **Sales by Month**.

It has **Date (Year, Quarter, Month, Day)** in **Category** and **Sales** in **Values.**

This is how other content will get affected if we select May:

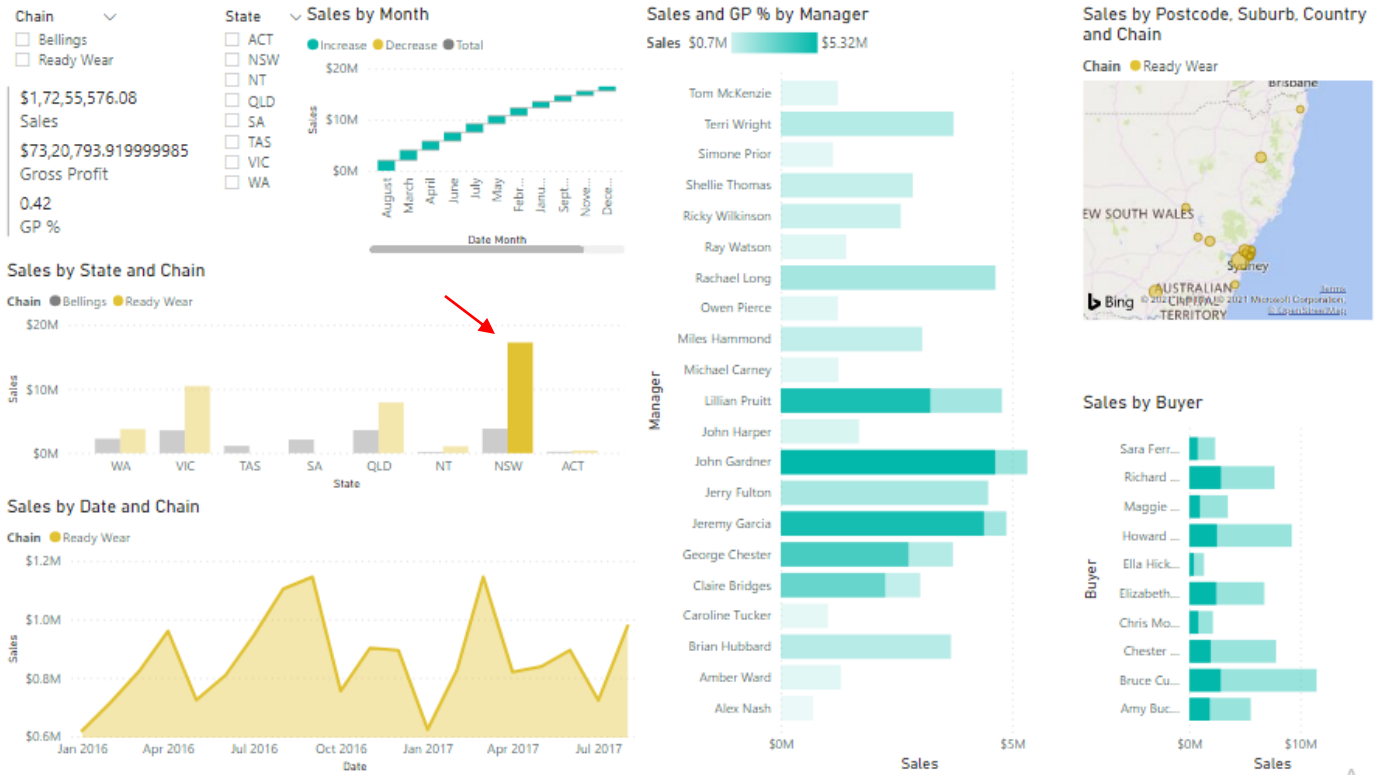


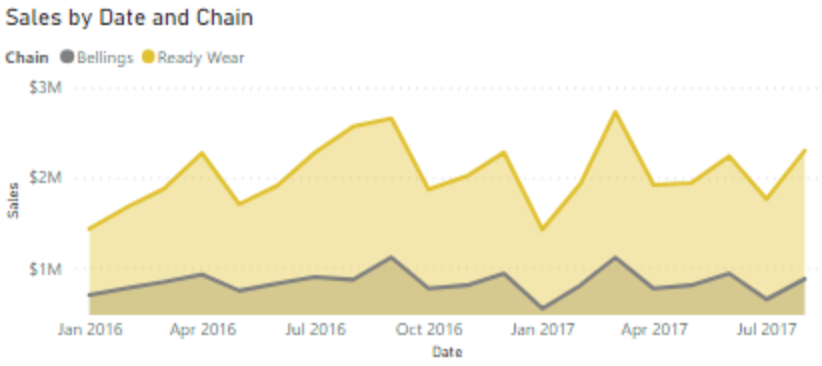


5) This is a **Clustered Column Chart** showing **Sales by State an Chain**.

It has **State** in **Axis**, **Chain** in **Legend** and **Sales** in **Values** in Visualizations section.

This is how other content will get affected if we select Ready Wear in NSW:

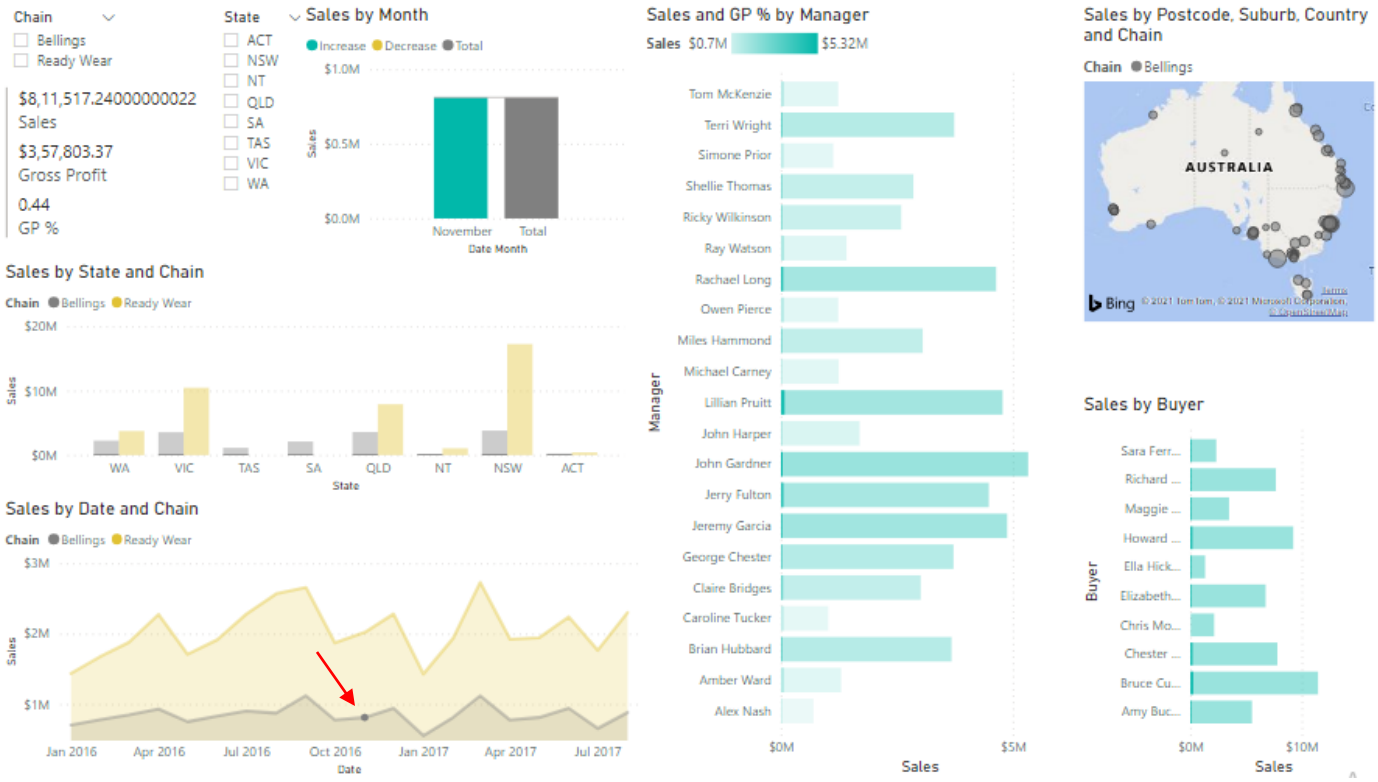


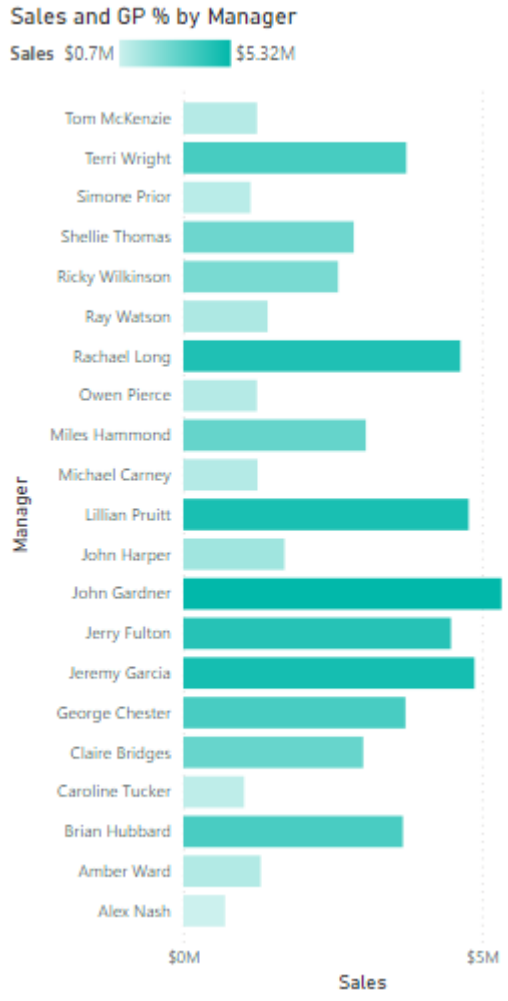


6) This is an **Area Chart** that shows **Sales by Date and Chain**.

It has **Date** in **Axis**, **Chain** in **Legend** and **Sales** in **Values** in Visualizations section.

This is how other content will get affected if we select this date:

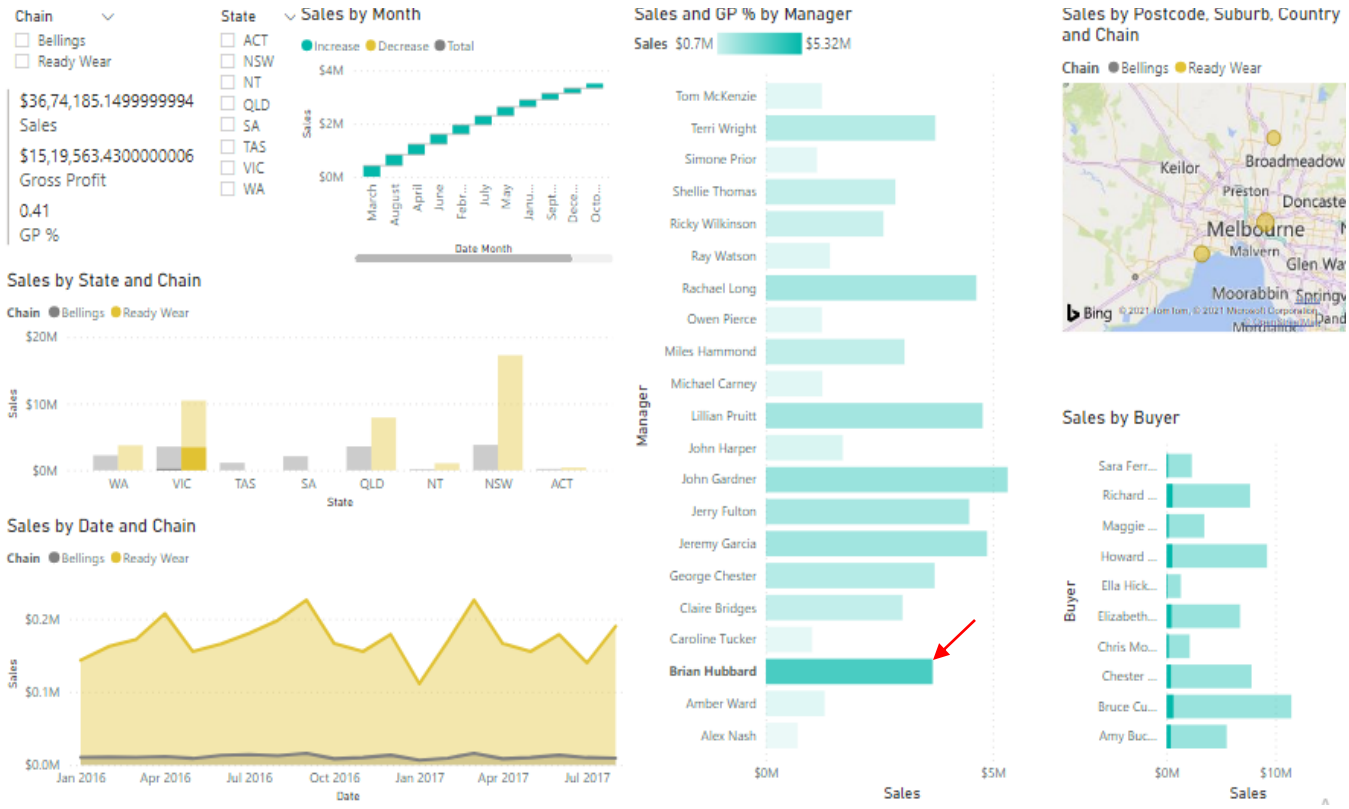




7) This is a **Clustered Bar Chart** that displays **Sales and GP% by Manager**.

It has **State** and **Manager** in **Axis**, **Sales** in **Values** and **GP%** in **Tooltips** in Visualizations section.

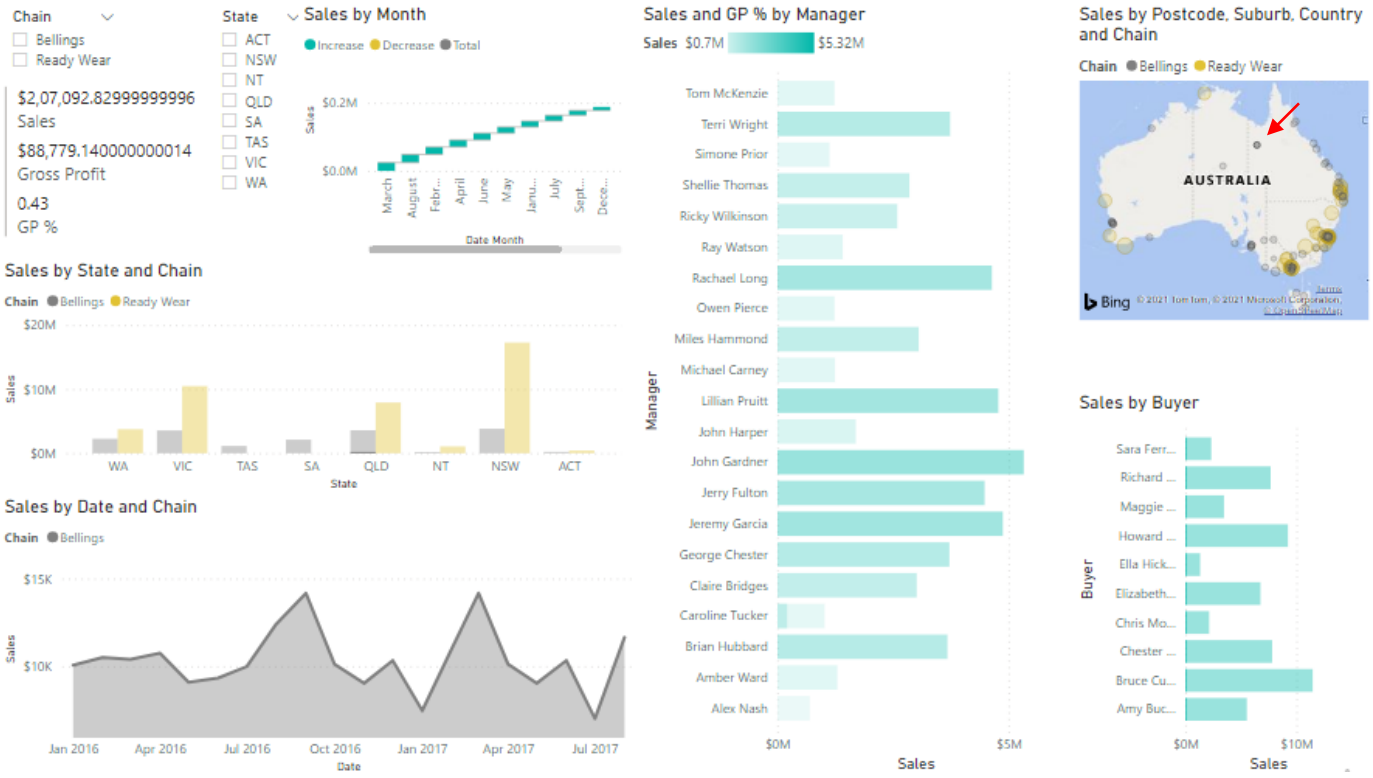
This is how other content will get affected if we select Brian Hubbard:

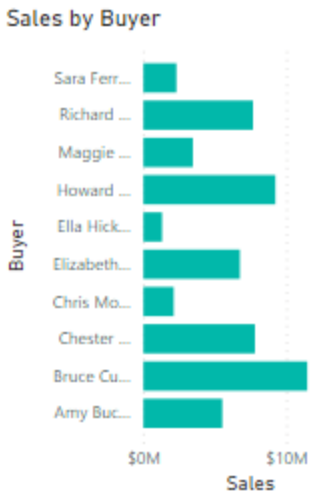


<u>8)</u> This is a **Map** that shows **Sales by Postcode, Suburb, Country and Chain.**

It has **Postcode, Suburb, Country** in **Location**, **Chain** in **Legend** and **Sales** in **Size** in Visualizations section.

This is how other content will get affected if we select this region:

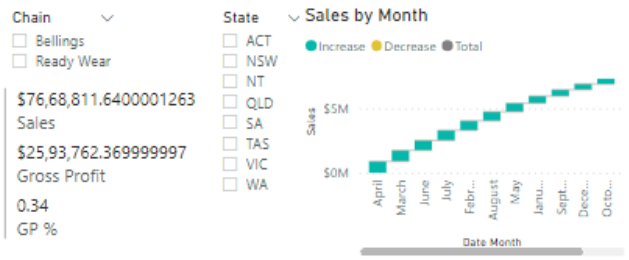


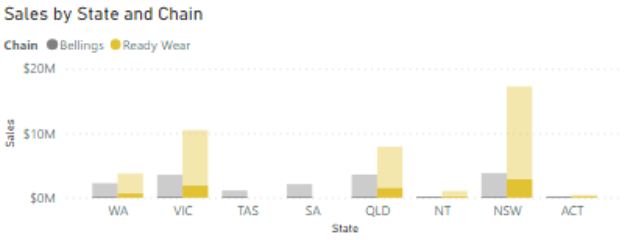


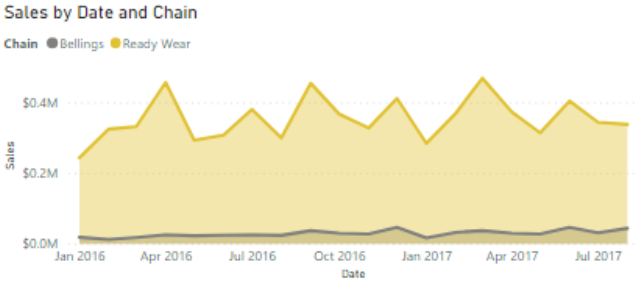
9) This is a **Clustered Bar Chart** which shows **Sales by Buyer**.

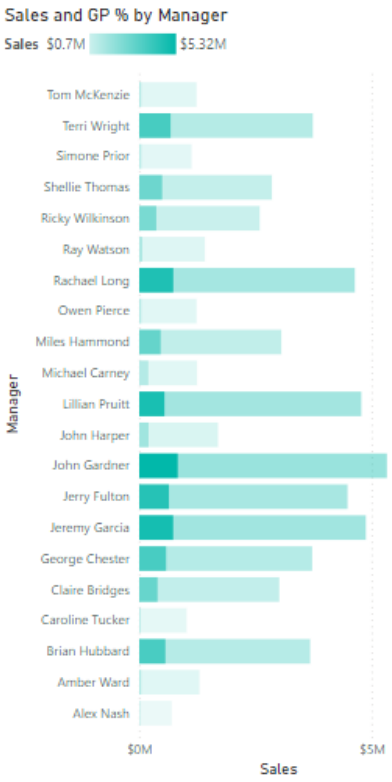
It has **Buyer** in **Axis** and **Sales** in **Values** in Visualizations section.

This is how other content will get affected if we select Richard as a buyer:


Chain
Bellings
Ready Wear
$76,68,811.6400001263
Sales
$25,93,762.369999997
Gross Profit
0.34
GP %
State
ACT
NSW
NT
QLD
SA
TAS
VIC
WA
Sales by Month
Increase
Decrease
Total
Sales
$5M
$0M
April
March
June
July
Febr...
August
May
Janu...
Sept...
Dece...
Octo...
Date Month


Sales by State and Chain
Chain
Bellings
Ready Wear
$20M
$10M
$0M
Sales
WA
VIC
TAS
SA
QLD
NT
NSW
ACT
State


Sales by Date and Chain
Chain
Bellings
Ready Wear
$0.4M
$0.2M
$0.0M
Sales
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Date


Sales and GP % by Manager
Sales
$0.7M
$5.32M
Tom McKenzie
Terri Wright
Simone Prior
Shellie Thomas
Ricky Wilkinson
Ray Watson
Rachael Long
Owen Pierce
Miles Hammond
Michael Carney
Lillian Pruitt
John Harper
John Gardner
Jerry Fulton
Jeremy Garcia
George Chester
Claire Bridges
Caroline Tucker
Brian Hubbard
Amber Ward
Alex Nash
Manager
$0M
$5M
Sales


Sales by Postcode, Suburb, Country and Chain
Chain
Bellings
Ready Wear
AUSTRALIA
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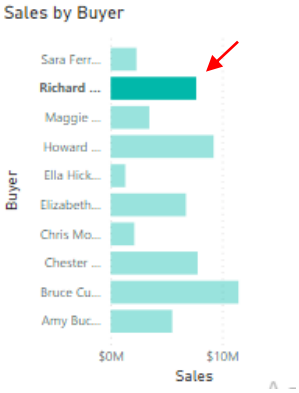
Sales by Buyer
Sara Ferr...
Richard ...
Maggie ...
Howard ...
Ella Hick...
Elizabeth...
Chris Mo...
Chester ...
Bruce Cu...
Amy Buc...
Buyer
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Sales

CHAPTER 7: CONCLUSION AND FUTURE WORK

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Conclusion

Dashboards in Power BI are blank canvases to implement visualizations and here I created 6 of them which show various details according to individual requirements. I have learnt how to clean the data and how to use various visualizations like charts and slicers provided by Power BI.

Future work

We have created 6 dashboards using the data from different Excel sheets. Following tasks need to be implemented ahead:

- Publishing and Accessing these Power BI reports
- Collaborating with manager and clients

CHAPTER 8: REFERENCES

CHAPTER 8: REFERENCES

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d. https://www.tutorialspoint.com/power_bi/power_bi_introduction.htm
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