BIBF
LEADING EXCELLENCE

ADVANCED POWER BI DESKTOP

REPORTS DESIGN

DESIGN, DAX & MEASURES

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UPDATED; MARCH 2022

MASTER FINANCIAL REPORT – ENTRY EXERCISE

Data File: **MASTER FINANCIAL DATA.xlsx**

SEGMENT	COUNTRY	PRODUCT	DISCOUNT BAND	UNITS SOLD	MANUFACTURI	SALE PRICE	GROSS SALES	DISCOUNTS	SALES	COGS	PROFIT	DATE
Government	Kuwait	Carretera	None	1,618.00	3	20	32,370	-	32,370	16,185	16,185	01/01/2020
Government	Bahrain	Carretera	None	1,321.00	3	20	26,420	-	26,420	13,210	13,210	01/01/2020
Midmarket	UAE	Carretera	None	2,178.00	3	15	32,670	-	32,670	21,780	10,890	01/06/2020
Midmarket	Bahrain	Carretera	None	888.00	3	15	13,320	-	13,320	8,880	4,440	01/06/2020

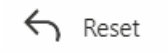
- Import the Database file into Power BI.
- Using Power BI DAX insert the following Columns:

  Month Name **MONTH NAME = FORMAT(FINANCIALS[DATE],"MMMM")** or **MONTH NAME = FINANCIALS[DATE].[Month]**

  Month Number **MONTH NUMBER = FORMAT(FINANCIALS[DATE],"MM")** or **MONTH NUMBER = FINANCIALS[DATE].[MonthNo]**

- Format the following columns:
  - Sales Decimals Number, Thousands Separator, 0 Decimals
  - GOGS Decimals Number, Thousands Separator, 0 Decimals, and rename the column to **COST**.
  - Profit Decimals Number, Thousands Separator, 0 Decimals
  - Unit Sold Whole Number, Thousands Separator, 0 Decimals
  - Month Name Sort the column by Month Number.
- Rename the Report Page to **MAIN REPORT**
- Change the **page background to the color #005675** (RGB: 0 86 117) and set transparency to 0

- On the top of the report page insert **4 cards** to show the following:
    - SALES
    - COST
    - PROFIT
    - UNIT SOLD
- On the Top Left of the page, report insert Reset Button

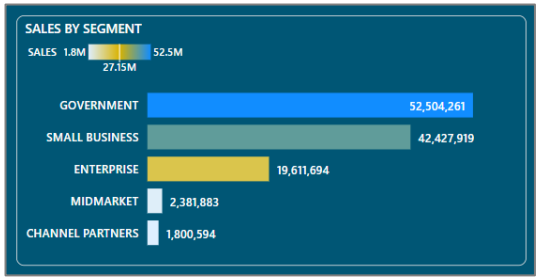


- Change the button Text to **REST ALL FILTERS**
    - Change the Text and Icon color to white.
    - Remove the Background.

- ON the left of the report page create 4 drops down slicers by:
    - COUNTRY
    - SEGMENT
    - DISCOUNT BAND
    - PRODUCT
    - The slicer colors, background #0081BD, and Item background #00567E with white font.

- Create SALES BY SEGMENT Bar Chart as shown below and apply conditional formatting on the Data Color.

- The conditional formatting is diverging 3 color scales.



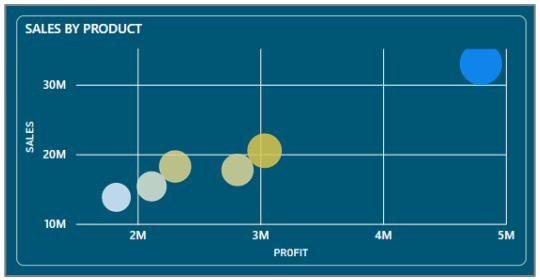
- Create PROFIT AND SALES BY PRODUCT Scatter Chart as shown below. (copy Sales By Segment chart and change it to Scatter Chart) so to maintain the conditional formatting.

DETAILS = PRODUCT

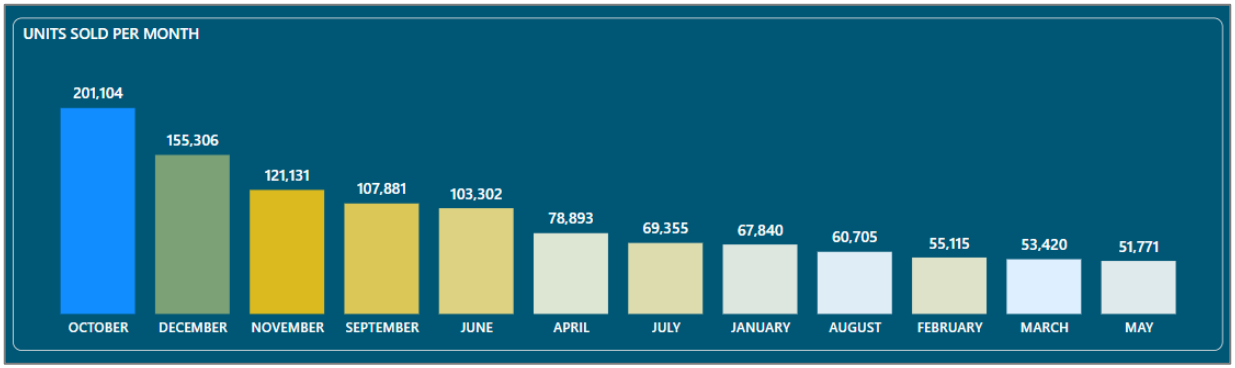
X = PROFIT

Y = SALES

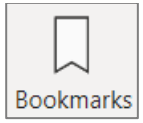
SIZE= SALES

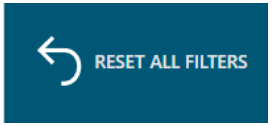


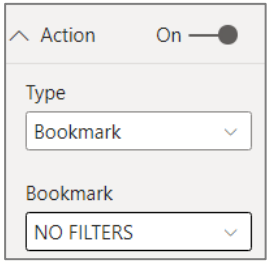
- Create the UNITS SOLD PER MONTH Column Chart as shown below. (copy Sales By Segment chart and change it to Scatter Chart) so to maintain the conditional formatting.



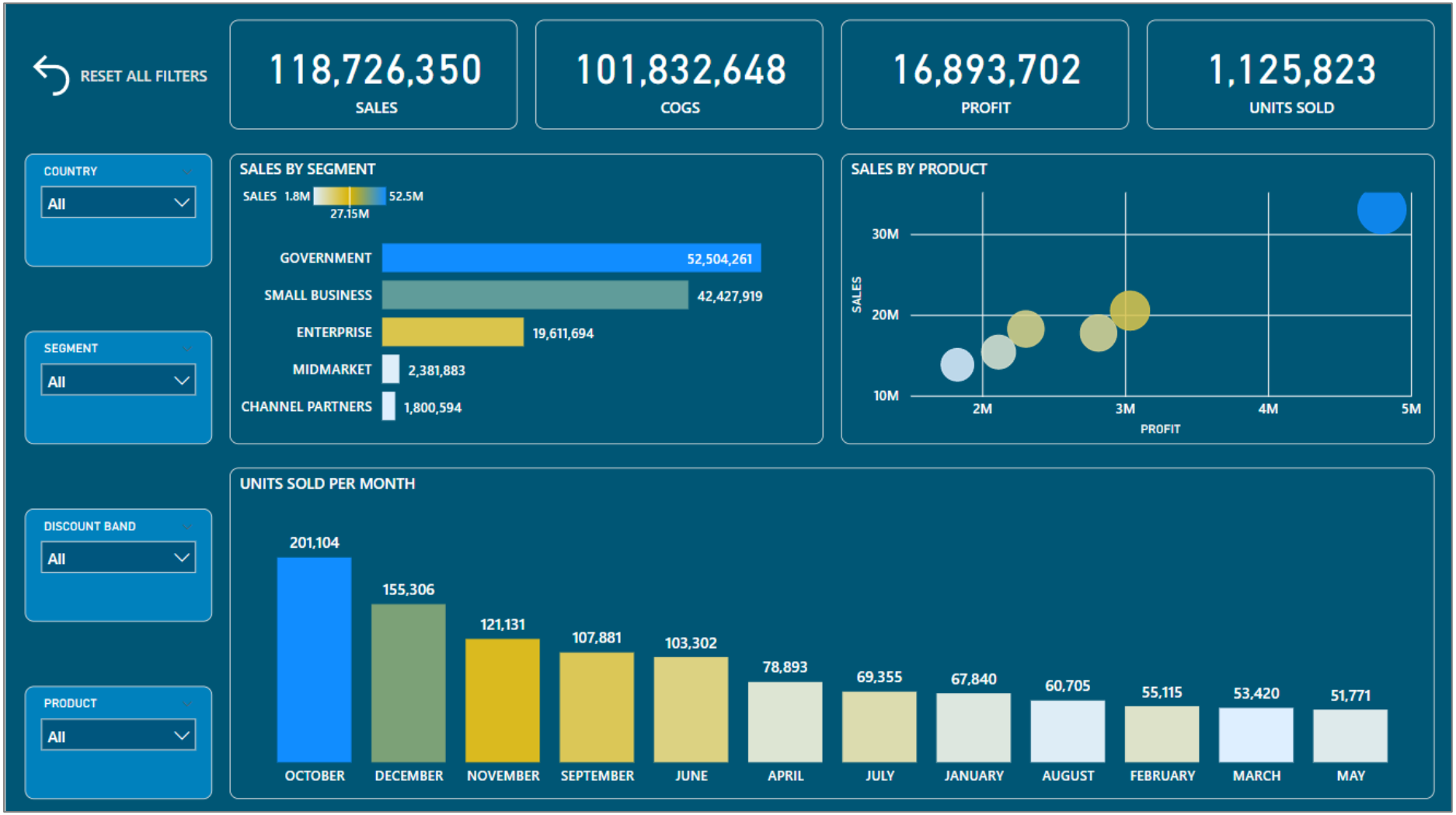
- Booking marking the page and applying the bookmark to the reset all Filter Button.
    - Make sure no slicers are used. (no filters)
    - Click View Tab, Bookmarks Button
    - On the Bookmarks Pane, click Add.
    - Rename the bookmark to NO FILTERS
    - Close the Bookmarks Pane
    - Click on the Reset All Filter Button
    - Under Formatting Button Pane, **Switch On** and Expand Action.
    - Under Type choose Bookmarks
    - Under Bookmark choose NO FILTER bookmark
    - To use the Reset Button, press and hold the CTRL key and then click the button.
- Test the Filters and Test the Reset Button.
- Below is a completed Report.







COMPLETED MASTER FINANCIAL REPORT.



BRIGHT DIRECTION TRAINING REPORT

Data File: **BRIGHT DIRECTION TRAINING DATA.xlsx**

Background Image: BRIGHT DIRECTION TRAINING REPORT.png

1st Color: #C2C9CF

Bright Direction Training is a training center that provides training services across six specialized business centers:

- Accounting
- Banking
- Insurance
- Islamic
- IT
- Management.

BRIGHT DIRECTION TRAINING DATA.xlsx contains the 2020 training activities with the following fields:

- CENTER: The Business Center conducting the course.
- TYPE: The type of course (Public, Professional, or Customized)
- COURSE TITLE: The Name of the courses
- START DATE: Course Start Date
- END DATE: Course End Date
- PARTICIPANTS: The number of participants who attended the course
- LECTURER: The name of the lecturer conducting the course
- FEEDBACK: The course Average feedback.

PREPARING THE DATA - CUSTOM COLUMNS NEED TO BE CREATED USING DAX

DAX FORMULAS

- DURATION = DATEDIFF(COURSES[START DATE],COURSES[END DATE],DAY)+1
- HOURS = COURSES[DURATION]*5
- INCOME = COURSES[DURATION]*COURSES[PARTICIPANTS]*100
- LECTURER FEES = COURSES[HOURS] * 50
- MATERIAL COST = COURSES[PARTICIPANTS]*12.5
- CATERING COST = COURSES[PARTICIPANTS]*COURSES[DURATION]*6.5
- NET INCOME = COURSES[INCOME] - COURSES[LECTURER FEES]- COURSES[MATERIAL COST]-COURSES[CATERING]
- QUARTER = COURSES[START DATE].[Quarter]

COLUMNS FORAMATTING

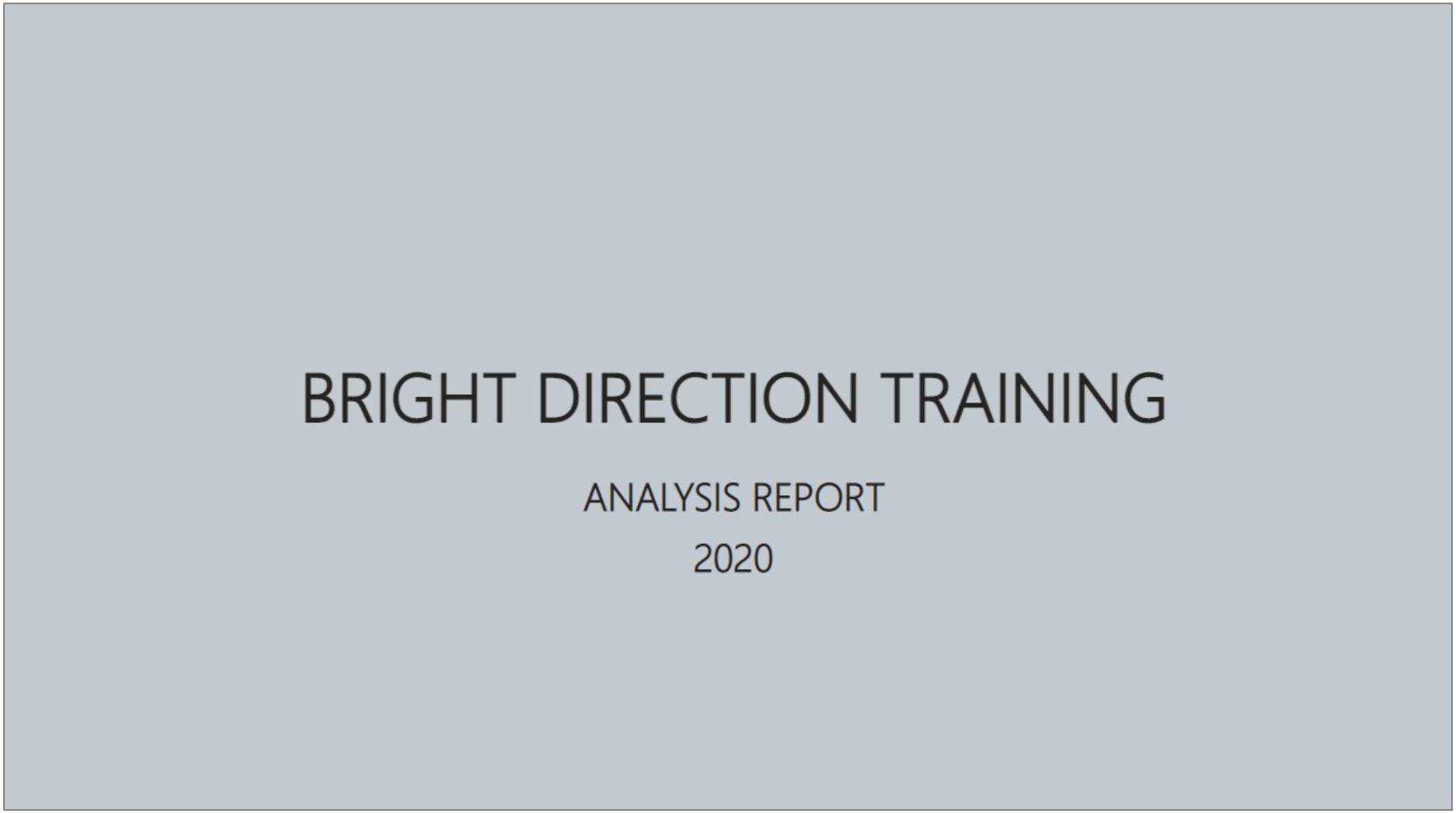
- CATERING COST: Decimals – Thousand Separator – 0 decimals
- CENTER: Text
- COURSE TITLE: Text
- DURATION: Whole Number – 0 decimals
- END DATE: Custom – dd/mm/yyyy
- FEEDBACK: Decimals – 2 decimals
- HOURS: Whole Number – 0 decimals
- INCOME: Decimals – Thousand Separator – 0 decimals
- LECTUERER FEES: Decimals – Thousand Separator – 0 decimals
- LECTURER: Text
- MATERIAL COST: Decimals – Thousand Separator – 0 decimals
- NET INCOME: Decimals – Thousand Separator – 0 decimals

- PARTICIPANTS: Whole Number – 0 decimals
- START DATE: Custom – dd/mm/yyyy

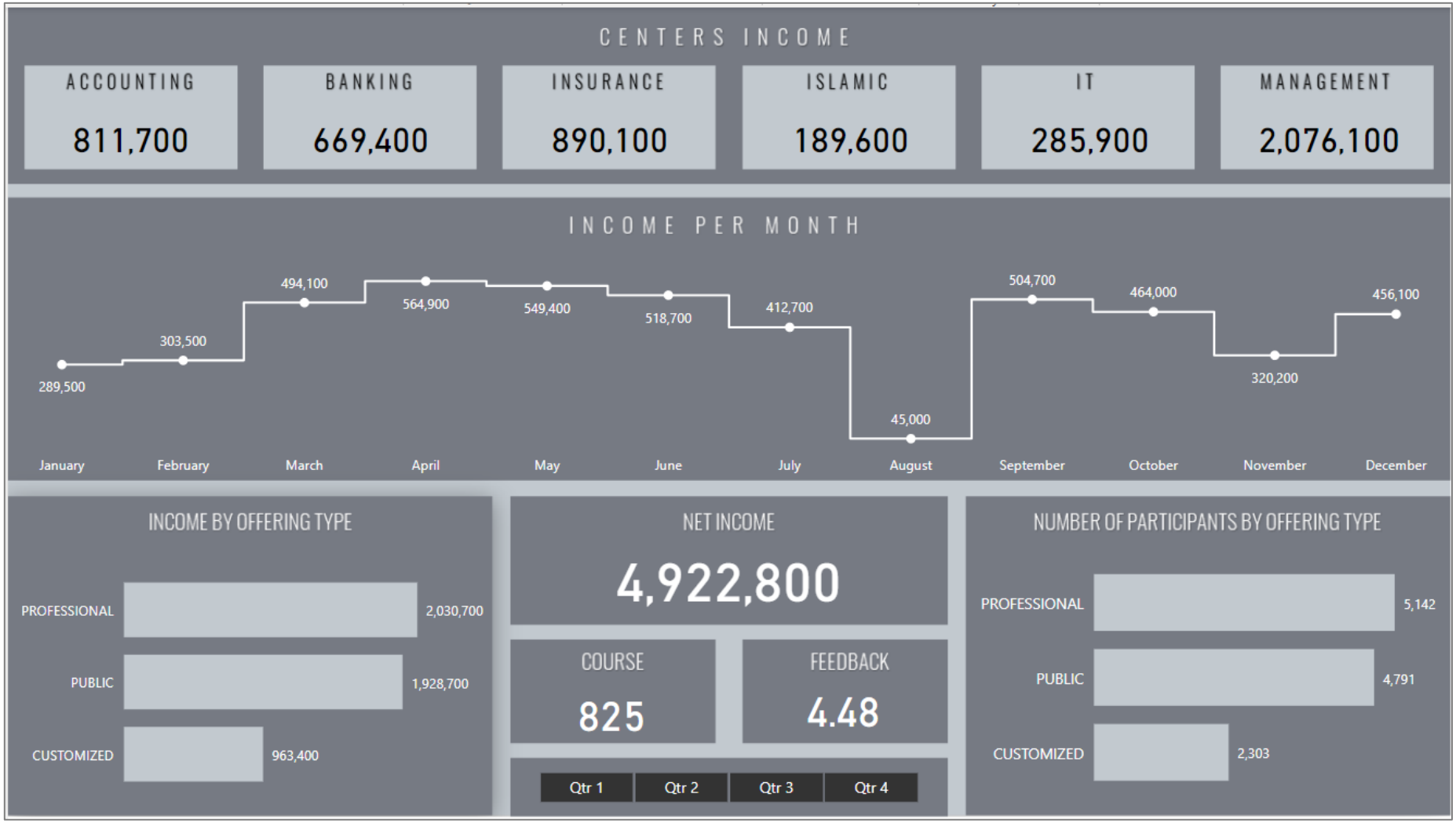
REPORT PAGES:

- COVER PAGE
- ANALYSIS REPORT PAGE
- FEEDBACK TOOLTIP (linked to INCOME BY OFFERING TYPE Bar Chart)
- NUMBER OF COURSES TOOLTIP (linked to INCOME PER MONTH line - Step Chart)
- COSTS TOOLTIP (linked to NUMBER OF PARTICIPANTS BY OFFERING TYPE Bar Chart)

COVER PAGE



ANALYSIS REPORT PAGE



TOOLTIPS PAGES

FEEDBACK TOOLTIP

NUMBER OF COURSES TOOLTIP

COSTS TOOLTIP

BAHRAIN TRADING COMPANY

Data File: **BAHRAIN TRADING 2021.xlsx**
Background Color: #A6A39C
2nd Color: #1A1A1A "Light"
3rd Color: #666666 "Dark"

Bahrain Training Company is a retail company that operates across Bahrain with the following facts:

- STORES
  - Amwaj
  - Diyar
  - Demonia
  - Seef
  - The Bay

- SALES REPRESENTATIVES
  - Region 1
    - Ahmed Abdulla and Zainab Hussain
  - Region 2
    - Sana Baqer, Sameera Ali, and Farooq Ebrahim

- **PRODUCTS**
    - Gardening - Pots - Recliner
    - Kitchen - Cutlery, Kettle, Toaster, Oven, Blender, and Fridge
    - Home Furniture - Chairs, Tables, Lamps, Shelves, Drawers, and sofa.

- **DATA** – All Sales Transactions

THE DATABASE

The database is stored in 4 different excel sheets:

POWER BI is to be used to create the report pages:

- Cover Page
- Home Page
- Sales Ranking
- Sales By Store
- Self Service BI – Composition Tree.

OVERVIEW OF THE DATA PROVIDED

PRODUCT SHEET

	A	B	C	D	E	F
1	**ProdID**	**Product**	**Product_Category**	**Price**	**Cost Price**	**Margin**
2	1	Chairs	Home Furniture	1250	900	28%
3	2	Tables	Home Furniture	1600	1200	25%
4	3	Lamps	Home Furniture	500	300	40%
5	4	Shelves	Home Furniture	600	400	33%
6	5	Drawers	Home Furniture	400	300	25%
7	6	Sofa	Home Furniture	1200	1000	17%
8	7	Cutlery	Kitchen	1400	1200	14%
9	8	Pots	Gardening	300	220	27%
10	9	Recliner	Gardening	1300	1150	12%
11	10	Kettle	Kitchen	600	350	42%
12	11	Toaster	Kitchen	400	250	38%
13	12	Oven	Kitchen	800	550	31%
14	13	Blender	Kitchen	1400	1100	21%
15	14	Fridge	Kitchen	3000	2200	27%
16						

SALES REPS SHEET

	A	B	C	D	E
1	**RepID**	**Sales Rep**	**Region**	**First Name**	**Last Name**
2	1	Sales Rep 1	Region 1	Ahmed	Abdulla
3	2	Sales Rep 2	Region 2	Sana	Baqer
4	3	Sales Rep 3	Region 1	Zainab	Hussain
5	4	Sales Rep 4	Region 2	Sameera	Ali
6	5	Sales Rep 5	Region 2	Farooq	Ebrahim
7					

STORES SHEET

	A	B	C	D	E
1	**StoreID**	**Store Name**	**RepId**	**Client Latitude**	**Client Longitude**
2	1	Amwaj	1	26.29111	50.664334
3	2	Dilmonia	2	26.271757	50.673728
4	3	Diyyar	3	26.310518	50.631105
5	4	Seef	4	26.242672	50.539491
6	5	The Bay	5	26.247476	50.577297
7					

DATA SHEET

	A	B	C	D	E	F	G	H	I
1	**ID**	**StoreID**	**RepID**	**Date**	**ProdID**	**Quantity**	**Available**	**Count**	**Budget**
2	1	1	1	25/02/2019	14	9	1	1	27,526.73
3	5	1	1	29/06/2019	5	7	1	1	2,740.58
4	11	1	1	08/04/2019	2	5	1	1	6,472.15
5	12	1	1	20/08/2019	2	1	1	1	1,285.28
6	15	1	1	26/05/2019	11	1	0	1	305.68
7	18	1	1	06/03/2019	8	8	1	1	2,554.04
8	21	2	2	10/11/2019	5	1	1	1	330.64
9	28	2	2	14/08/2019	13	8	0	1	9,210.60

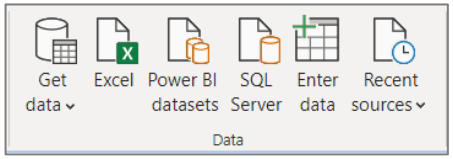
BUSINESS QUESTIONS

As you are developing these Power BI reports based on the above-given data, you will start asking some questions, and need to find answers to these questions

- What are the Total Sales?
- What are the Total Costs?
- What are the Total Profits?
- What is Profit Margin?
- What is the Total Quantity?
- What is the Total Number of Transactions?
- What are the Total Sales per Product?
- What is the Sales Ranking by Store, by Sales Representative, and by Product?
- You will also need to filter the report by Year, Month, Region, and Product Category

IMPORTING THE DATA SOURCE

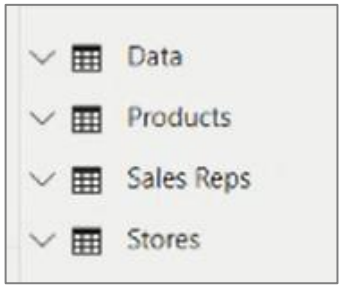
The first thing we need to look at is creating the actual Power Bi Data Model and importing the data.



From the Home, Tab click the Excel Icon

Or the best practice is to import your data from Power Query, as it loads only sample data and not the full data set. If you import the data from the Power Bi landing page, you import all the actual data.

- From Power Query, choose New Source, Excel, Navigate to the Source Excel File, Choose the file and click Open.
  The file name is **BAHRAIN TRADING 2021 .xlsx**
- Choose the Sheets tabs and click ok
- Click Close and Apply (switch back to Power BI)

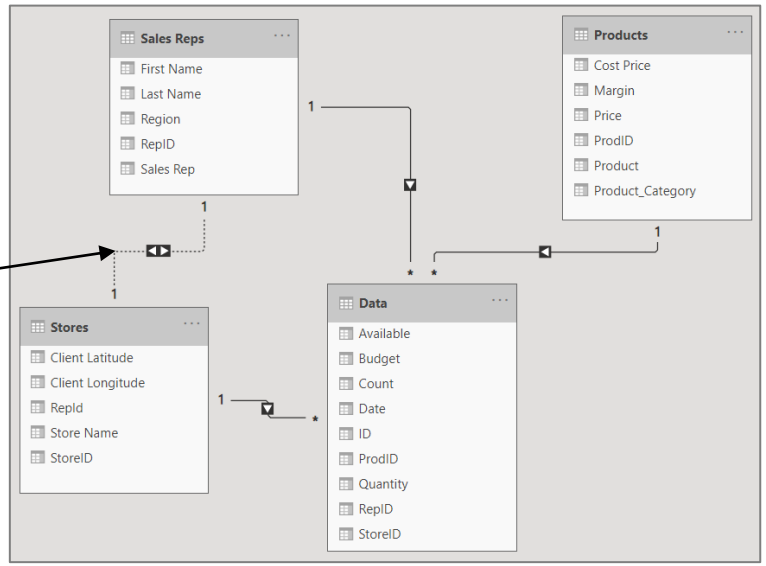


FORMATTING THE DATA

- When we clicked close and apply, all tables are created in Power BI.
- At this stage, we need to save the model as **BAHRAIN TRADING REPORT 2021**
- Click Transform Data, we need to make sure that the formatting of the data is correct.
- Make sure that there unwanted columns in your data
- Check if the data type of each column is correct
- If you find the data type is not correct, right-click on the column and change the data type.
- Once you made sure all data is correct, close and apply.

RELATIONSHIP

When you view your data in Power BI and click the model icon, you will see the relationship between the table that Power BI did automatically.



If you see a dotted line between the Sales Reps Table and the Stores Table.

The **dotted line indicates** that there is **an issue** in the relationship between both tables.

Power BI joins the tables if both tables have the same name. which in most cases is not true. Power BI thinks that there should be a relationship between both tables.

The best practice is to define your relationship.

RELATIONSHIP

- Store Table StoreID ➔ Data Table StoreID
- Sales Reps Table RepID ➔ Data Table RepID
- Products Table ProductID ➔ Data Table ProductID

CREATING THE REPORT PAGES

Now we will start building the report template.

- Insert the following page and name them accordingly
    - COVER PAGE
    - HOME PAGE
    - SALES RANKING
    - SALES BY STORE
    - SELF SERVICE BI

CREATE NEW COLUMNS TO THE DATA TABLE

- Year — Year = Data[Date].[Year]
- Month (month number) — Month = Data[Date].[MonthNo]
- Quarter — Quarter = Data[Date].[Quarter]

NOTE: For the Month number, you will notice the months when used as a slicer will not be sorted as required. In this case, you will need to add a month number from within the Power Editor (transformation). This will be used as a sorting file for the month.

CREATING A TABLE TO STORE ALL THE DAX MEASURES

DAX is the formula language that Power BI uses. This is what adds power to Power BI. You can use to fields in all the tables to create visualizations and produce output, but you will not be able to push Power BI to an advanced level without DAX. When you create DAX, Measures gives Power BI the Power which are formulas that you can drag and drop into any dimension.

To create a measure, you right-click on a table and select New Measure. Or on the main Tab click New Measure Icon. Once you choose New Measure a formula bar appears on the top of the page where you enter your DAX formulas.

Once a measure is created, you will see a calculator icon with the name of the measure appear in the fields list.

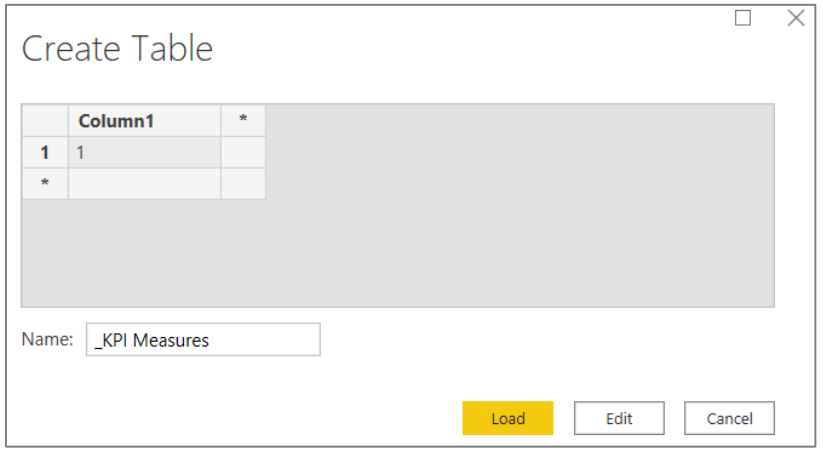
The problem is if we have many measures on every table, is easy to get missy and we have to look for them under each table. **A good practice is to create a separate table where you store all the measures**.

- First, we have to create a Table.
- Click the **Home** Tab and choose **Enter Data.**
- We will call the Table: **_KPI Measures**

The reason there is an underscore before KPI.The measure tables appear on the top of the tables list.

- Under the column just enter 1
- Click Load

A table has been created with no data in it. Just column 1 field where we will hide it at a later stage.



CREATING KPI DAX MEASURES

- Create the **Total Sales** measure

In the DATA, for every transaction, we have Product ID, Quantity, but we do not have the total sales amount. So, we will create a Total Sale Measure.

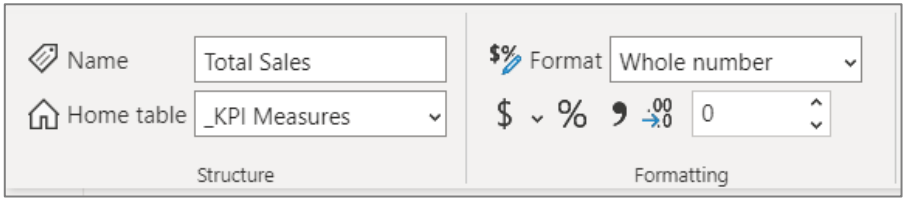
- Right, Click on the _KPI Measure Table or the Home Tab click New Measure.
- Choose New Measure
- On the formula bar enter the following:

  Total Sales = SUMX(Data,Data[Quantity] * RELATED(Products[Price]))

What is the formula means:

Multiply the Quantity in the **Data** Table by the Price in the **Product** Table. Then add them all together.

The measure can be formatted. Once you select a measure, a new Tab will appear. Measure Tools where you can format the measures.



Note: You can delete the Column1 field as it is not needed. Right-click on the Column1 field and choose Delete from the model.

Now well create all other measures under the **_KPI Measure** table. One measure at a time

Total Cost = SUMX (Data, Data[Quantity] * RELATED (Products[Cost Price]))

Total Quantity = SUMX(data,Data[Quantity])

Total Budget = SUMX(Data,Data[Budget])

Total Transactions = COUNTROWS(Data)

Total Profits = [Total Sales] - [Total Cost]

Profit Margins = DIVIDE ([Total Profits],[Total Sales], 0)

Sales Ranking by Product = RANKX (ALL (Products), _KPI measures'[Total Sales],, ASC, Skip)

Sales Ranking by Rep = RANKX (ALL ('Sales Reps'), '_KPI measures'[Total Sales],, ASC, Skip)

Sales Ranking by Store = RANKX (ALL (Stores),'_KPI measures'[Total Sales],, ASC, Skip)

CREATING REPORTS VISUALISATION – HOME PAGE

CARDS

- TOTAL SALES — Total Sales Measure — _KPI MEASURES TABLE
- TOTAL COSTS — Total Cost Measure — _KPI MEASURES TABLE
- TOTAL PROFIT — Total Profit Measure — _KPI MEASURES TABLE
- PROFIT MARGIN — Profit Margin Measure — _KPI MEASURES TABLE
- TOTAL QUANTITY — Total Quantity Measure — _KPI MEASURES TABLE
- TOTAL TRANSACTIONS — Total Transactions Measure — _KPI MEASURES TABLE

PRODUCT TOTAL SALES COLUMN CHART

Axis	Product	Product Table
Value	Total Sales	_KPI Measures Table

CREATING REPORTS VISUALISATION – SALES RANKING PAGE

TOTAL SALES BY PRODUCT BAR CHART

Axis	Product	Product Table
Value	Sales Ranking By Product	_KPI Measures Table

SALES RANKING BY SALES REP BAR CHART

Axis	Sales Rep name	Sales Reps Table
Value	Sales Ranking By Rep	_KPI Measures Tables

SALES RANKING BY STORE BAR CHART

Axis	Store Name	Stores Table
Value	Sales Ranking By Store	_KPI Measures Table

CREATING REPORTS VISUALISATION – SALES BY STORE PAGE

TOTAL SALES BY STORE MAP CHART

Location	Store Name	Stores Table
Latitude	Client Latitude	Store Table
Longitude	Client Longitude	Store Table
Value	Total Sales	_KPI Measures Table

SALES DETAILS - MATRIX

Rows	Store Name	Stores Table
Value	Total Sales	_KPI Measures Table
	Total Cost	_KPI Measures Table
	Total Profit	_KPI Measures Table
	Total Budget	_KPI Measures Table
	Total Quantity	_KPI Measures Table

CREATING REPORTS VISUALISATION – SELF SERVICE BI

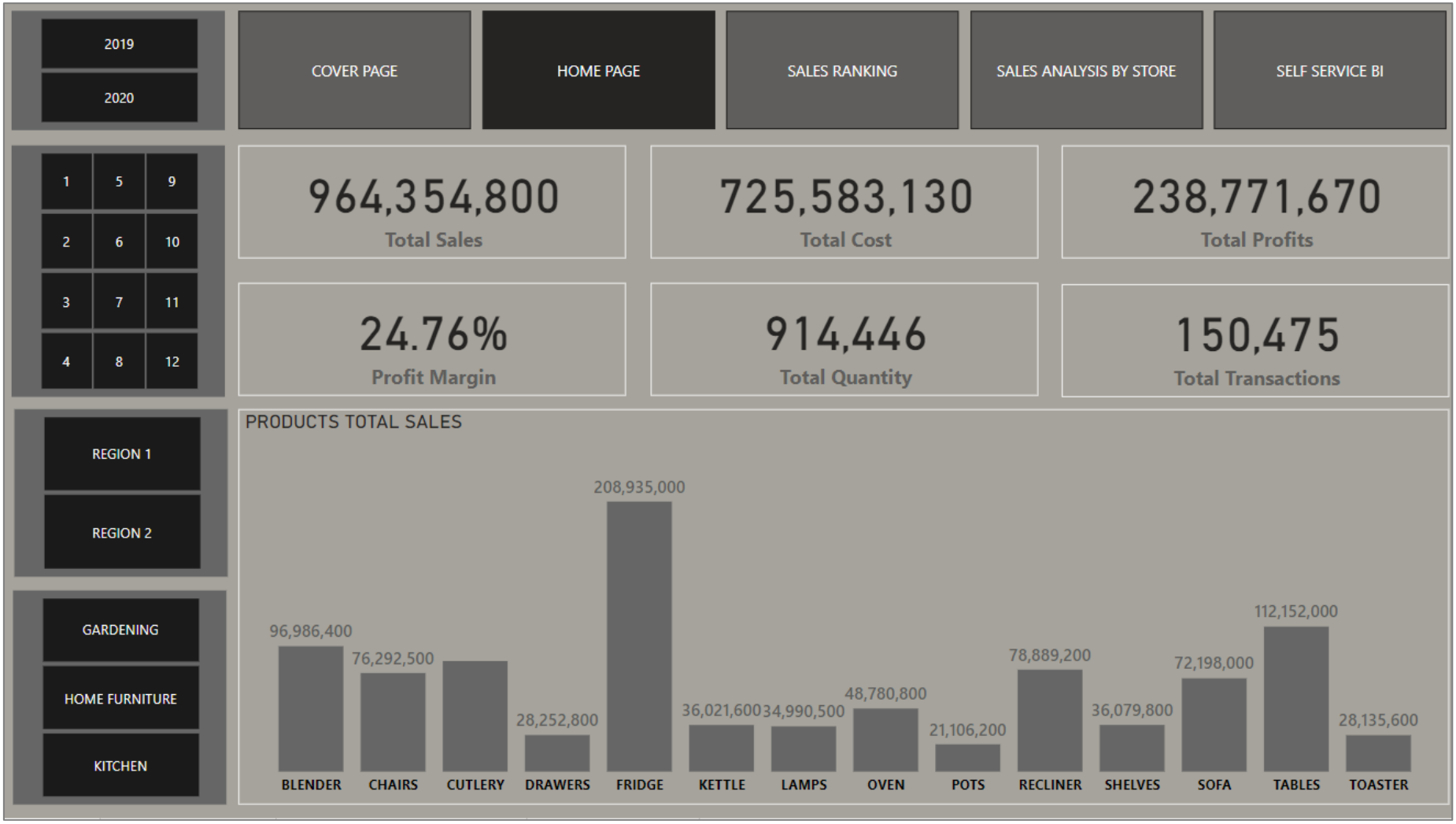
DECOMPOSITION TREE

Analyze	Total Sales	_KPI Measures Table
Explained By	Date Year	Data Table
	Product Category	Product Table
	Date Quarter	Data Table
	Product	Product Table

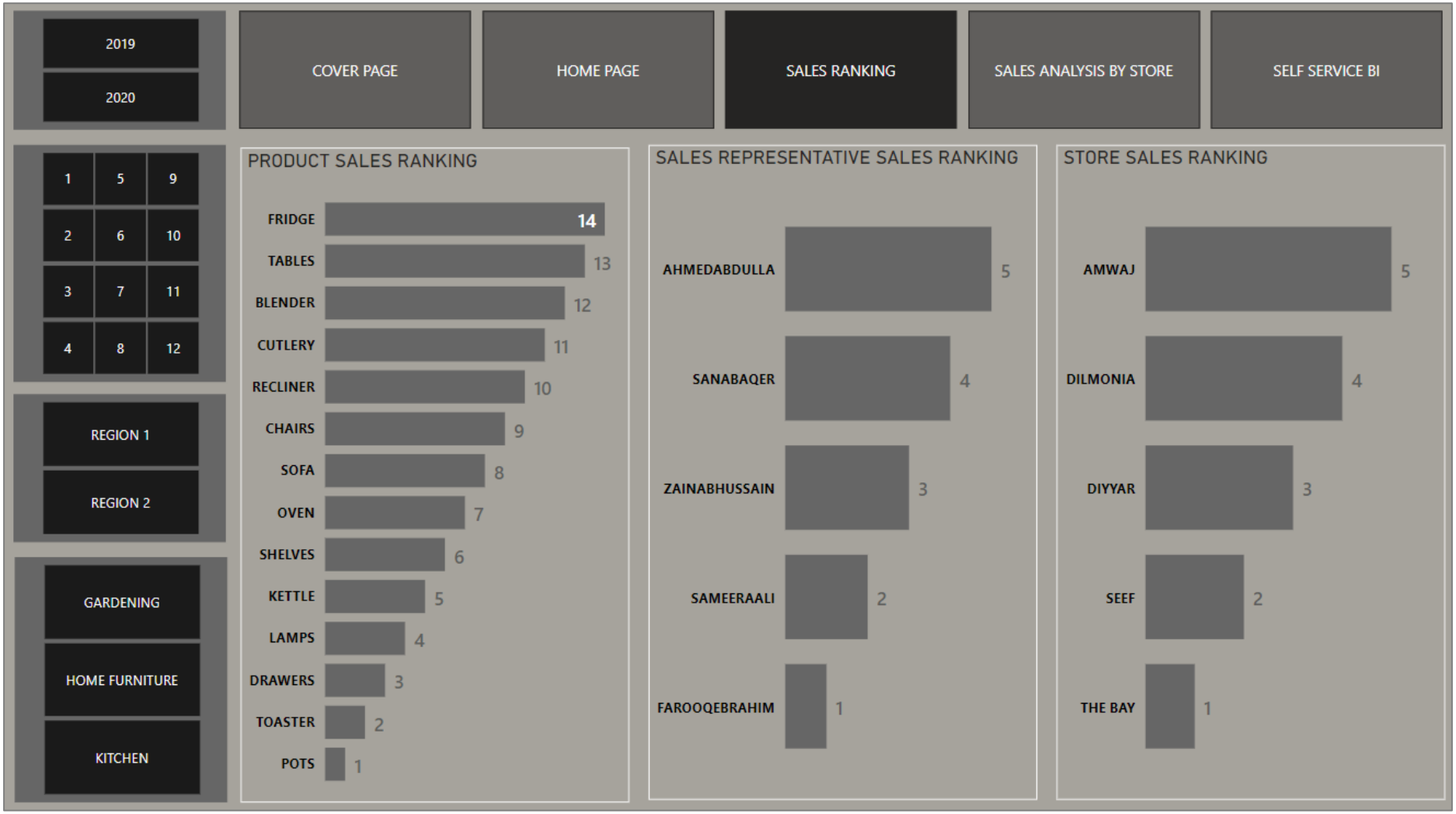
COVER PAGE.

BAHRAIN TRADING COMPANY
Analysis Report
COVER PAGE
HOME PAGE
SALES RANKING
SALES ANALYSIS BY STORE
SELF SERVICE BI

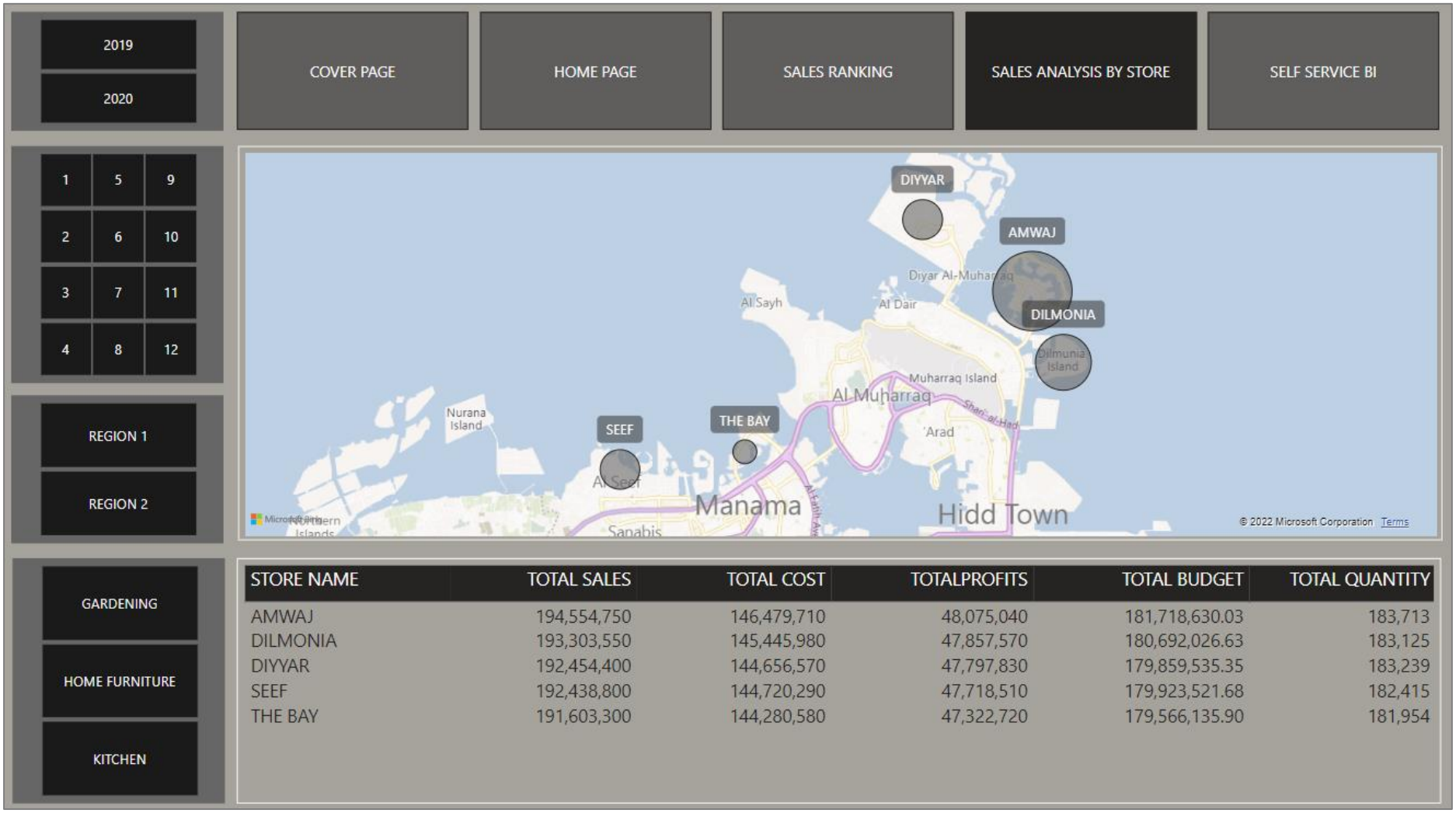
HOME PAGE


2019
2020
COVER PAGE
HOME PAGE
SALES RANKING
SALES ANALYSIS BY STORE
SELF SERVICE BI
1
5
9
2
6
10
3
7
11
4
8
12
964,354,800
Total Sales
725,583,130
Total Cost
238,771,670
Total Profits
24.76%
Profit Margin
914,446
Total Quantity
150,475
Total Transactions
REGION 1
REGION 2
GARDENING
HOME FURNITURE
KITCHEN
PRODUCTS TOTAL SALES
96,986,400
76,292,500
28,252,800
208,935,000
36,021,600
34,990,500
48,780,800
21,106,200
78,889,200
36,079,800
72,198,000
112,152,000
28,135,600
BLENDER
CHAIRS
CUTLERY
DRAWERS
FRIDGE
KETTLE
LAMPS
OVEN
POTS
RECLINER
SHELVES
SOFA
TABLES
TOASTER

SALES RANKING PAGE

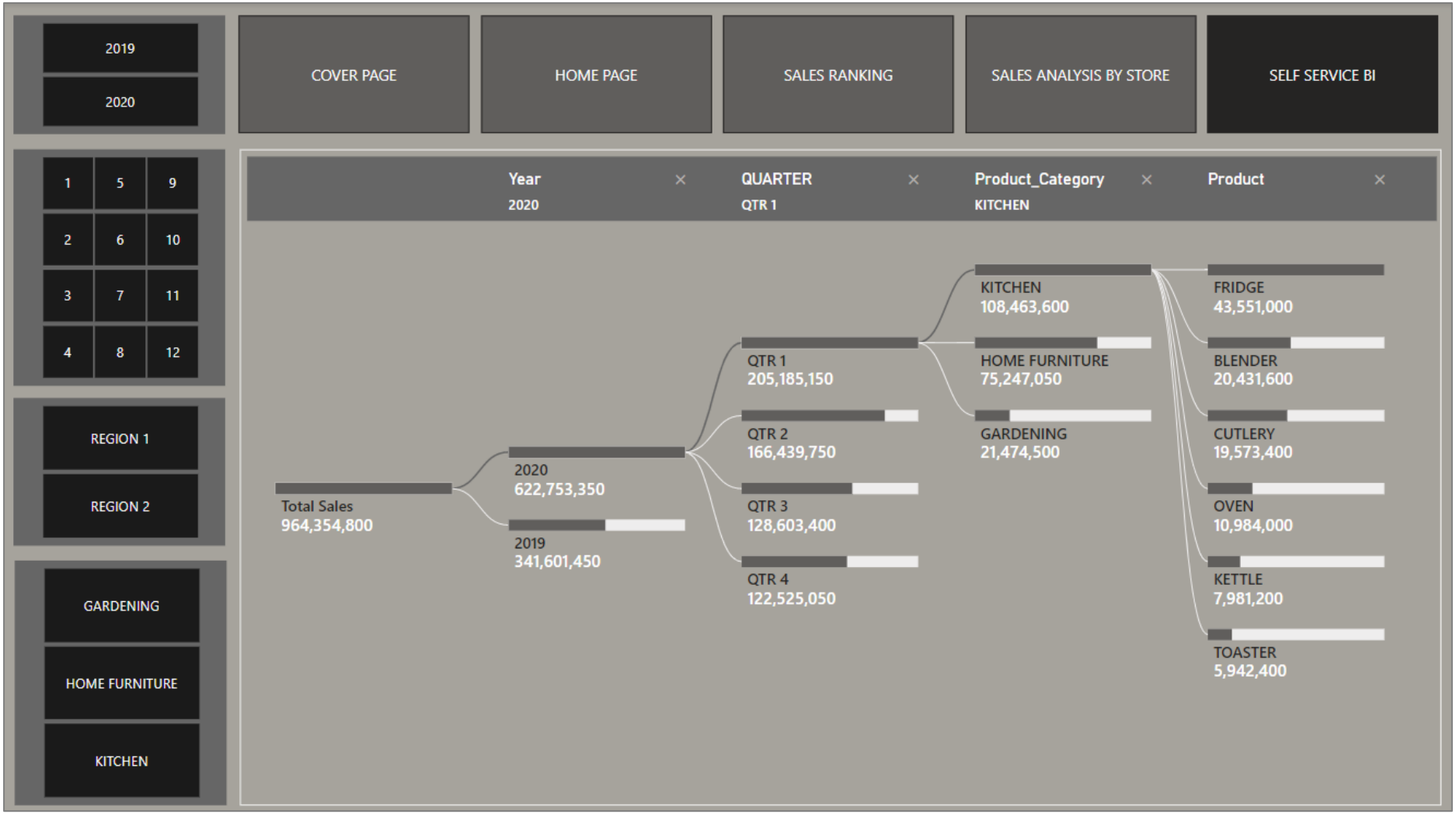


SALES BY STORE



STORE NAME	TOTAL SALES	TOTAL COST	TOTALPROFITS	TOTAL BUDGET	TOTAL QUANTITY
AMWAJ	194,554,750	146,479,710	48,075,040	181,718,630.03	183,713
DILMONIA	193,303,550	145,445,980	47,857,570	180,692,026.63	183,125
DIYYAR	192,454,400	144,656,570	47,797,830	179,859,535.35	183,239
SEEF	192,438,800	144,720,290	47,718,510	179,923,521.68	182,415
THE BAY	191,603,300	144,280,580	47,322,720	179,566,135.90	181,954

SELF SERVICE BI – DECOMPOSITION TREE



SALES ANALYSIS REPORT

Data Files:	SALES ANALYSIS.XLSX
Background:	SALES ANALYSIS REPORT BACKGROUND.png
Icons:	LINE CHART ICON.png
	COLUMN CHART ICON.png

WHAT IS NEEDED

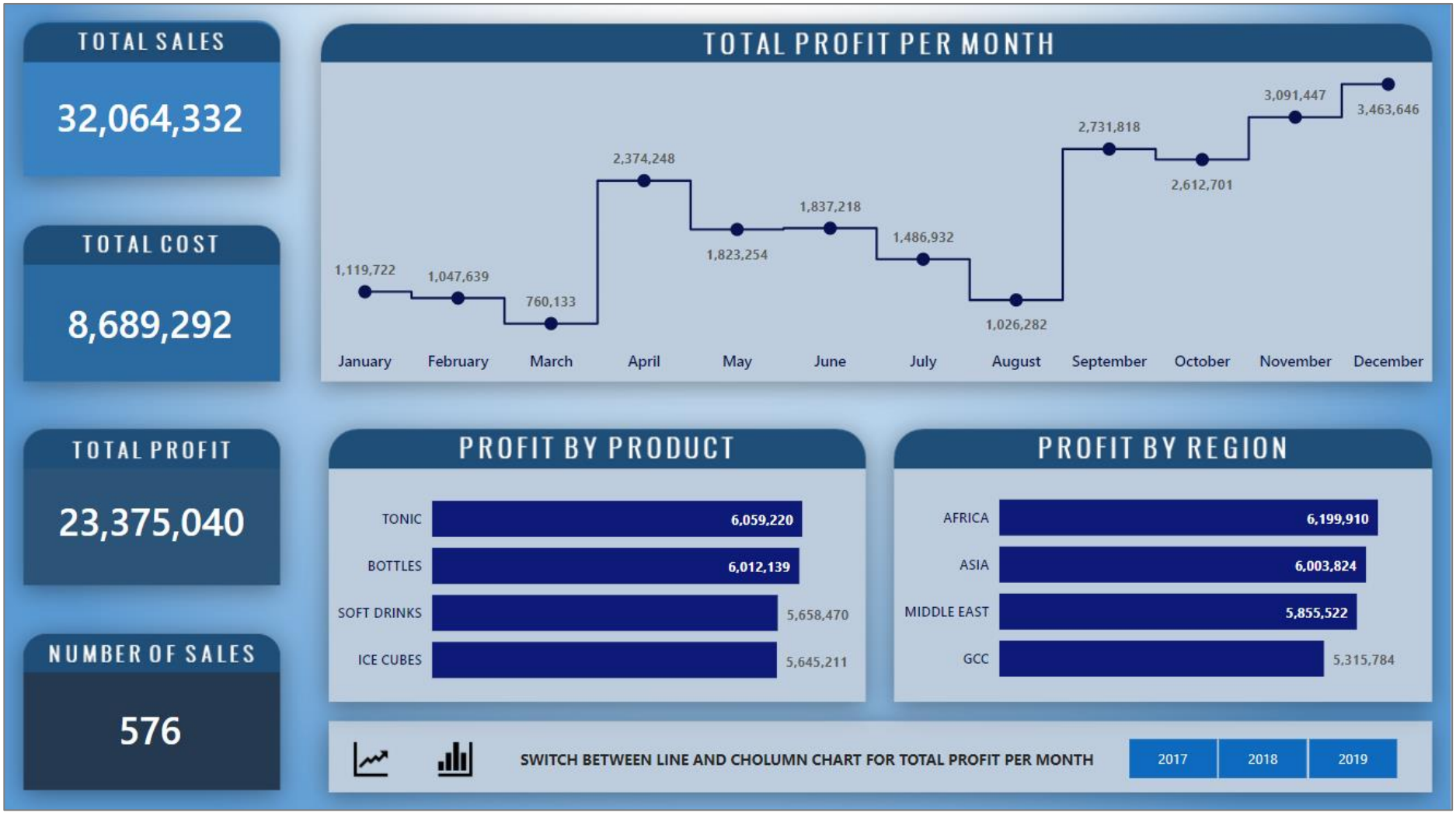
Sales Analysis Report is a report that needs to be designed by Power BI for analysis and presentation. The report should have the following elements:

- Total Sales as a Card
- Total Cost as a Card
- Total Profit as a Card
- Number of Sales as a Card
- Profit by Product as a Bar Chart
- Profit by Region as a Bar Chart
- Filter by Year as a Slicer
- Two Icon to switch between Line Chart and Column Chart to show Profit Per Month. (Using Selection and Bookmarks options)

PREPARING THE DATA

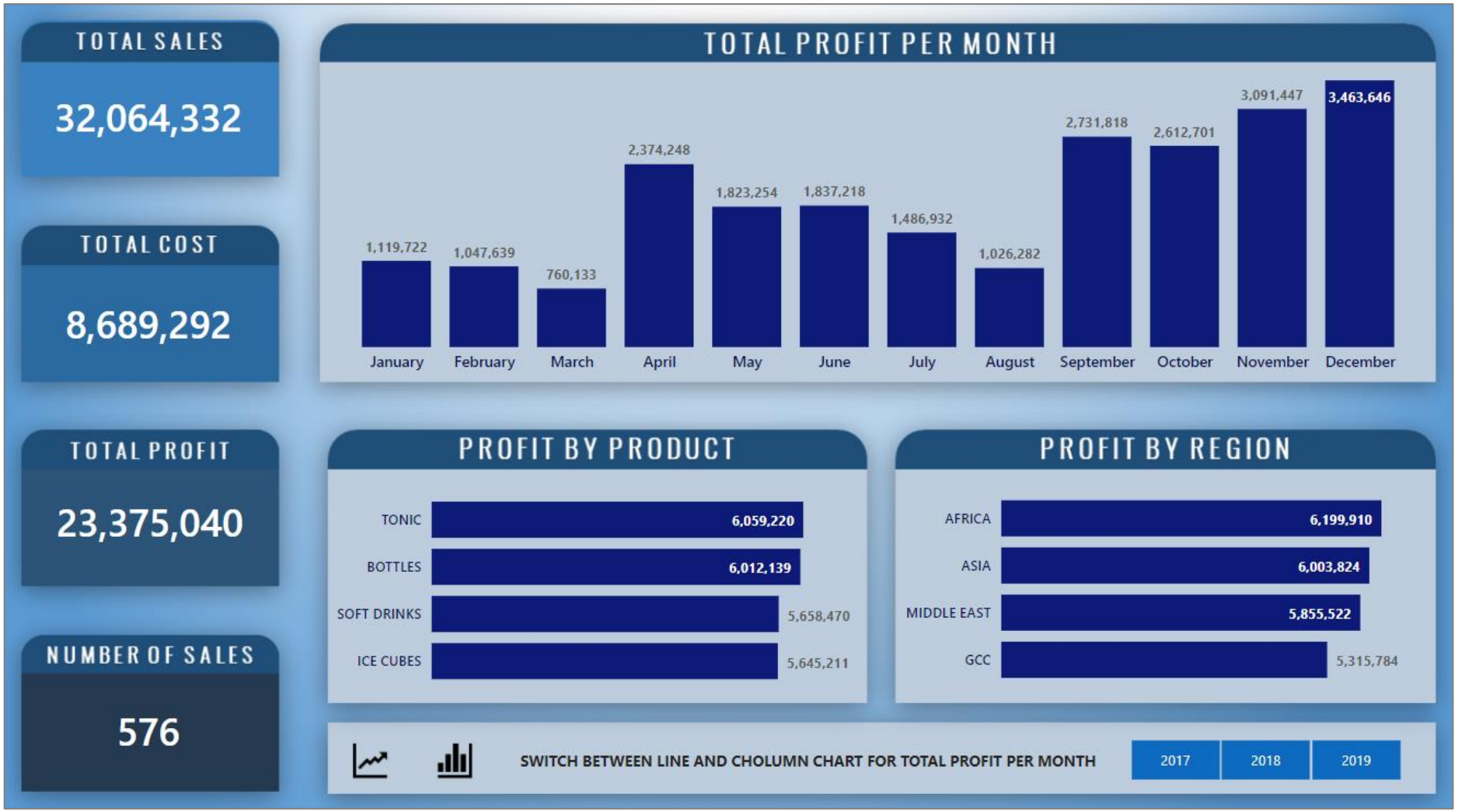
- Get the file: **Sales Analysis.xlsx.**
- Choose Transform Data
- Insert a Month Column (Name of Month) – Rename the column as MONTH
- Insert a Month Column (Month) – Rename the column as MONTH NUMBER
- Insert a Year Column (and change its type to Text)
- Transform Sales Region Column to Uppercase
- Transform Month Name Column to Uppercase
- Insert a PROFIT column = Sales - Costs
- Close and Apply
- Save the file as SALES ANALYSIS REPORT.PBIX
- Click the Model Icon
- Hide the columns, CUSTOMER, SALESPERSON, and ORDER DATE
- The MONTH column is text to be sorted by Month Number, then hide the Month Number Column
- Format SALES, COSTS, PROFIT columns to Decimal Number, 0 Decimals, Thousand Separator
- Click on the Report Icon
- Add the Page Background Image: SALES ANALYSIS REPORT BACKGROUND.PNG and reduce the Transparency to 0%
- Built the Report Shown Below.

LINE CHART REPORT



COLUMN CHART REPORT

Note: You need to Press Ctrl Key and click the Line Chart Icon or Column Chart icon to switch between the Profit Per Month Chart.



THE FINANCIAL REPORT

Data Files: **FINANCIAL DATA.XLSX**
Background Color: #C2C9CF
Visuals Background Color: #1B6E71

SEGMENT	COUNTRY	PRODUCT	DISCOUNT BAND	UNITS SOLD	UNIT PRICE	DISCOUNTS	COST PER UNI	SALES DATE
Government	Bahrain	Carretera	None	1618.5	20.00	-	10.00	31/12/2018
Government	UAE	Carretera	None	1321	20.00	-	10.00	31/12/2018
Midmarket	Kuwait	Carretera	None	2178	15.00	-	10.00	31/05/2019

The Financial Data show the sales transaction to five GCC countries. With the table structure as shown below.

PREPARING THE DATA

- Import the data to Power BI Desktop
- Transform the Data
- Delete the DISCOUNT BAND and DISCOUNTS columns
- Add the following New Columns in Power Bi Desktop
    - **TOTAL SALES** = Unit Price x Units Sold
    - **TOTAL COSTS** = Cost Per Unit x Units Sold
    - **PROFITS** = Total Sales – Total Costs
- Close and Apply
- Change the properties of the newly added columns to Zero Decimals, 1000 Separator
- Create a table name: **_MEASURES** to hold all the measures that will be created.
- Create the following Measures using **CALCULATE**, **SUMX,** and **FILTER** DAX functions
    - TOTAL PROFIT FOR: BAHRAIN, KSA, KUWAIT, QATAR, and UAE (example shown below)
      BAHRAIN PROFIT = SUMX(FILTER(DATA,DATA[COUNTRY]="Bahrain"),DATA[PROFIT])
    - Using the CALCULATE DAX function to create the Total Profit Measure:
      TOTAL PROFIT = CALCULATE(SUM(DATA[PROFIT]))
    - Using the COUNTROWS DAX function to create the Number of Sales Measure:
      NUMBER OF SALES = COUNTROWS(DATA)
    - Using the CALCULATE DAX function to create the Total Sales Measure

TOTAL SALES = SUMX(DATA,DATA[TOTAL SALES])

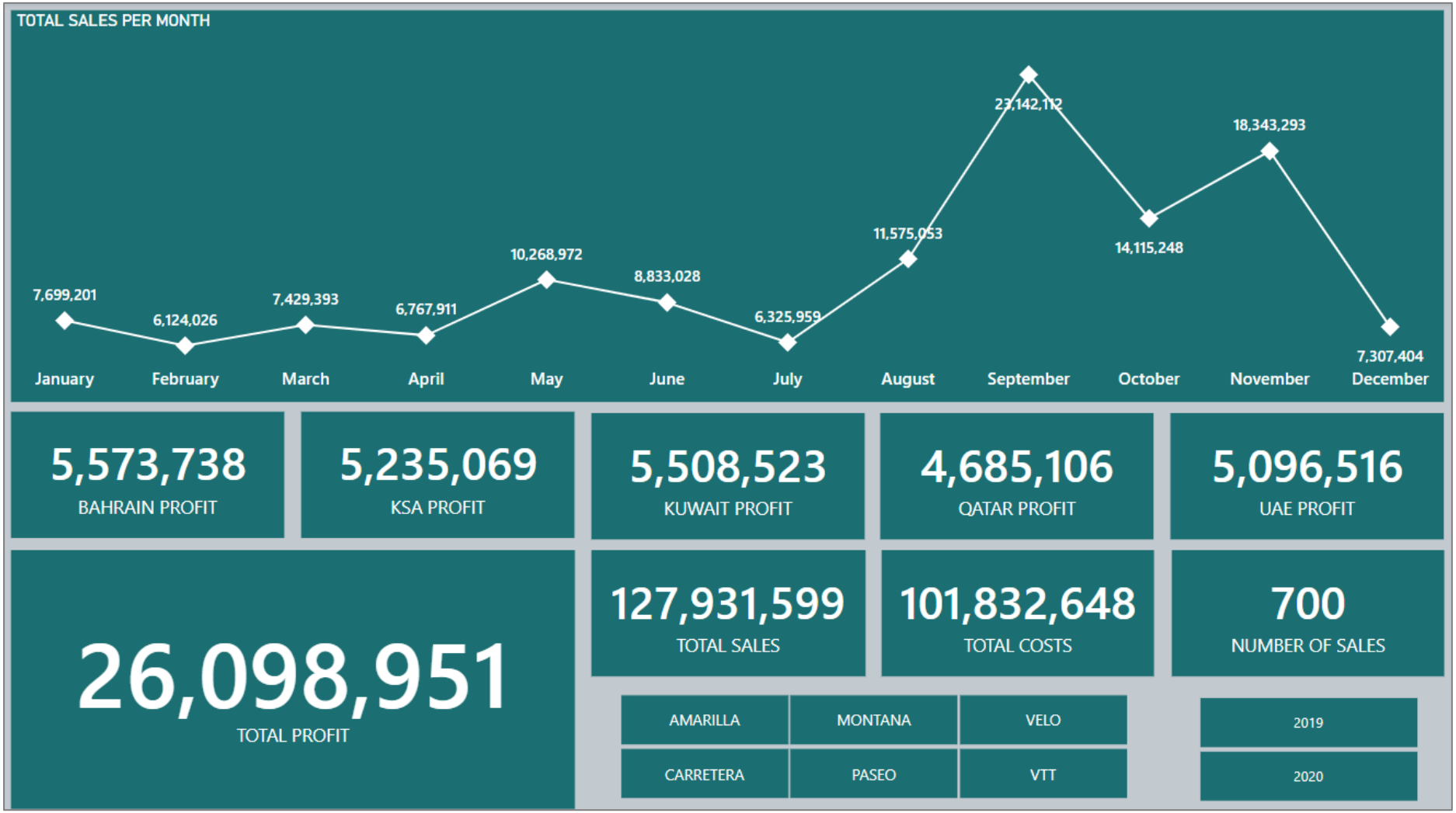
- Using the CALCULATE DAX function to create the Total Cost Measure

  TOTAL COSTS = CALCULATE(SUM(DATA[TOTAL COSTS]))

  Using the Measure Tool Bar format all the measures to Comma After 1000 and zero decimals.

- Design the report Below.

REPORT PAGE


TOTAL SALES PER MONTH
7,699,201
6,124,026
7,429,393
6,767,911
10,268,972
8,833,028
6,325,959
11,575,053
23,142,112
14,115,248
18,343,293
7,307,404
January
February
March
April
May
June
July
August
September
October
November
December
5,573,738
BAHRAIN PROFIT
5,235,069
KSA PROFIT
5,508,523
KUWAIT PROFIT
4,685,106
QATAR PROFIT
5,096,516
UAE PROFIT
26,098,951
TOTAL PROFIT
127,931,599
TOTAL SALES
101,832,648
TOTAL COSTS
700
NUMBER OF SALES
AMARILLA
MONTANA
VELO
CARRETERA
PASEO
VTT
2019
2020

SALES MART REPORT

Data File: **SALES MART.XLSX**
Reports Background: THE SALES MART REPORT - REPORTS BACKGROUND.png
Sales Report Background: THE SALES MART REPORT - REPORT TWO BACKGROUND.png
1st Color: #E6E6E6
2nd Color: #B3B3B3
3rd Color: #808080

Sales Mart is a company located in Bahrain. The company sells its products online. The company markets are around the Gulf Region. Currently, the products are shipped to three countries: **Kuwait**, **KSA**, and **UAE**. A sales data based is provided in Excel File Format for the periods of **2017**, **2018**, **2019**, and **2020**. The file contains two Tables:

Table one: **ORDER_LIST** with the following structure:

Order ID	Order Date	Customer Name	Country	Segment	Ship Date	Ship Mode

Table two: **ORDER_BREAKDOWN** with the following structure:

Order ID	Product Name	Price	Quantity	Category	Sub Category

PREPARING THE DATA

The **ORDER_BREAKDOWN** table needs **new fields** for the report creation **(Query Editor)**

- **Sales = Quantity x Price**
- **Sales Indicator** to show High, Medium, and Low Sales (**conditional Columns**)
    - **High Sales**: all sales >=1000
    - **Medium Sales** all sales >= 500
    - **Low sales** all sales <500

The **ORDER_LIST** table needs **new fields** for the report creation **(Query Editor)**

- **Order Year**
- **Order Month**
- **Order Month Number**

CREATE 3 QUICK MEASURES (Power Bi Desktop)

- Total High Sales
- Total Medium Sales
- Total Low Sales

A new table within Power BI needs to be added. The table name is **COUNTRIES POSITION** with the following fields:

COUNTRY	LATITUDE	LONGITUDE
UAE	24.466667	54.366669
KUWAIT	29.378586	47.990341
KSA	24.774265	46.738586

In the Power BI MODEL section, Link the COUNTRIES POSITION table to the ORDER_LIST table

REPORT ONE DESIGN:

- Card: Total Sales
- Card: Total High Sales
- Card: Total Medium Sales
- Card: Total Low Sales
- Donut Chart: Sales by Country
- Bar Cart: Sales by Segment
- Pie Chart: Sales by Category
- Column Chart: Number of Shipments by Ship Mode
- Slicer: Order Year
- Slicer: Order Month

REPORT TWO DESIGN:

- Line Chart: Number of orders per Month (Step Line Chart, Markers, and Data Label)
- Bar Chart: Number of orders per segment
- Bar Chart: Number of orders per country
- Slicer: Order Year

- **Side Bar**: When clicking an arrow, a slide bar showing: Card – Total Sales, Card – Furniture Sales, Card – Office Supplies Sales Card – Technology Sales

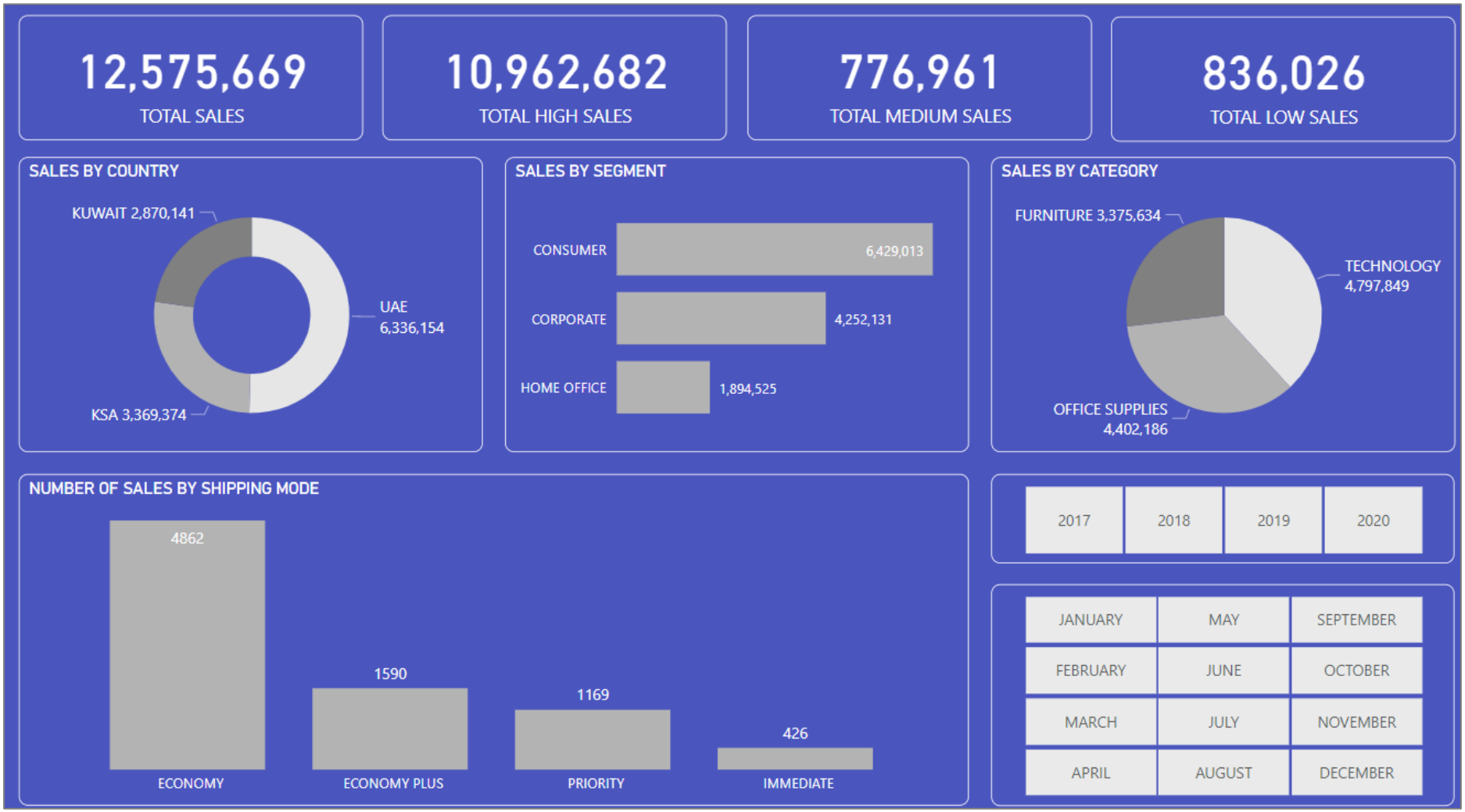
REPORT THREE DESIGN:

- Card: Total Sales
- Card: Number of Sales
- Table: Top 10 Products Sales — Table showing Product Name and Sales. **Conditional Formatting** showing **bar** on Sales Value.
- Slicer: Order Month
- Slicer: Order Year
- Map: Countries Sales — Grey Style Map Showing Sales Bubbles (Large Bubbles)

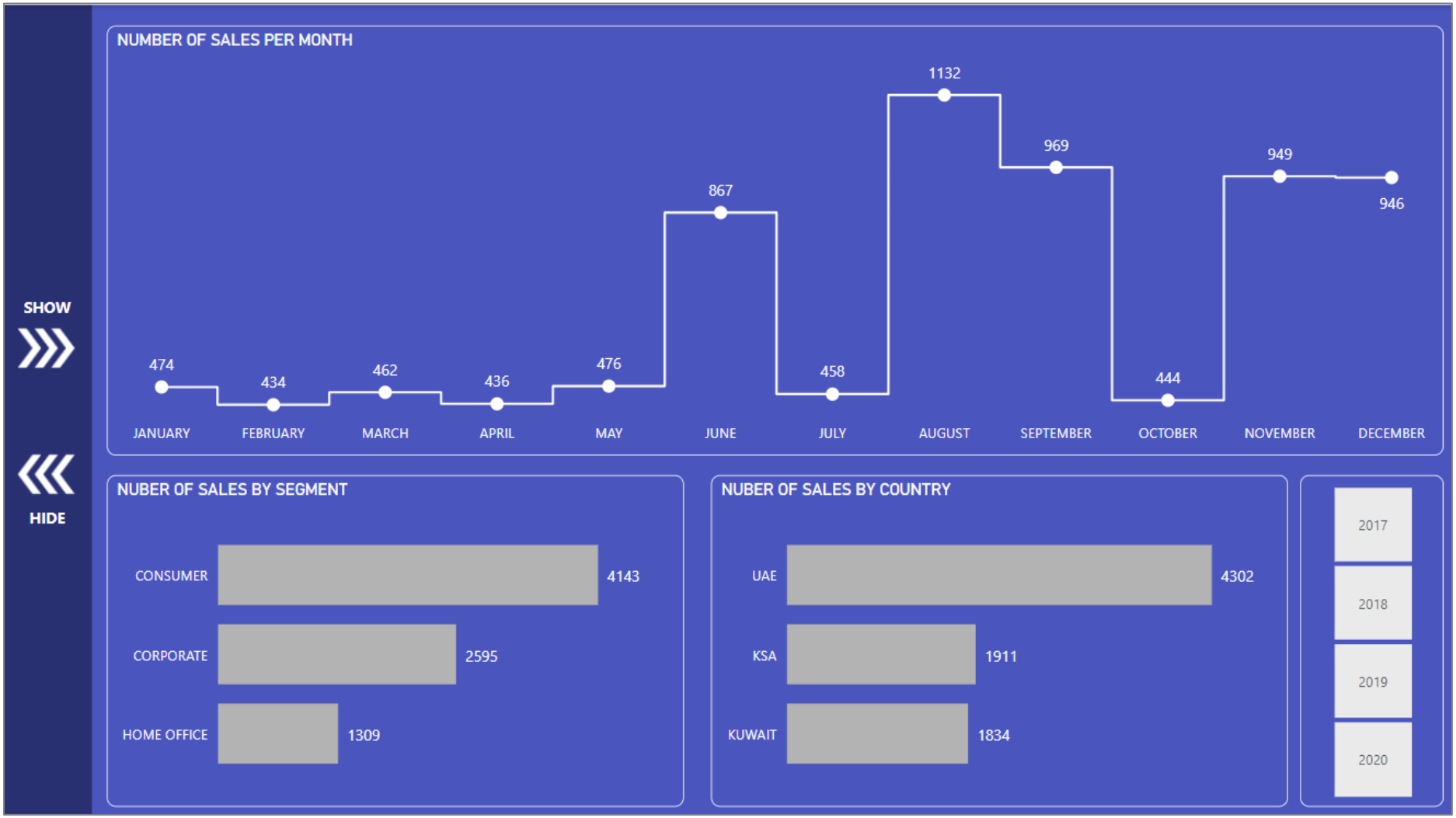
ToolTip Page when pointing to any country, a column chart showing Sales by Segment

Drill Through When drilling down any Chart that contains Total Sales country a table showing the following fields - Country, Product Name, Category, Quantity, Price, Sales.

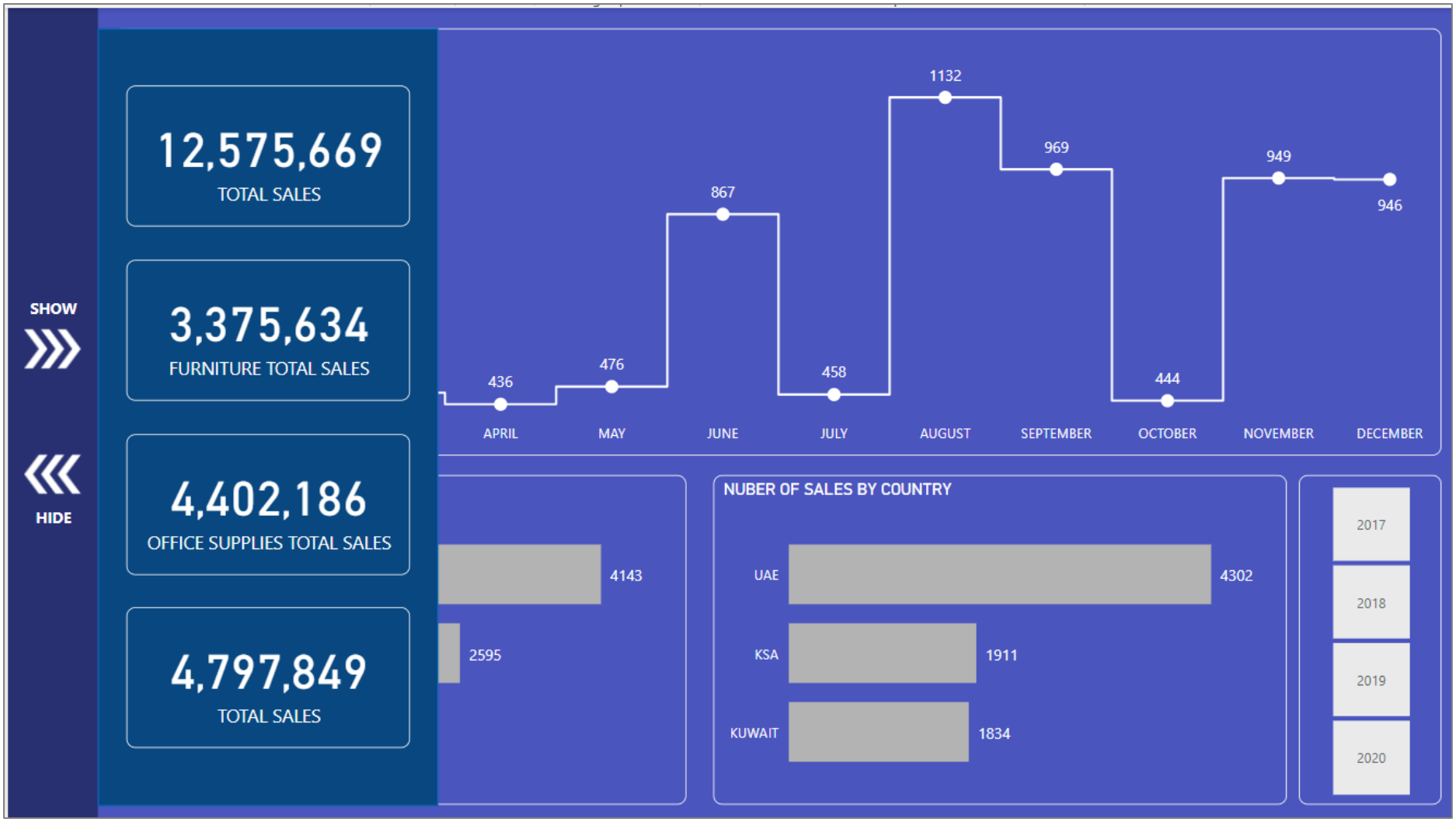
REPORT ONE:


12,575,669
TOTAL SALES
10,962,682
TOTAL HIGH SALES
776,961
TOTAL MEDIUM SALES
836,026
TOTAL LOW SALES
SALES BY COUNTRY
KUWAIT 2,870,141
UAE
6,336,154
KSA 3,369,374
SALES BY SEGMENT
CONSUMER
6,429,013
CORPORATE
4,252,131
HOME OFFICE
1,894,525
SALES BY CATEGORY
FURNITURE 3,375,634
TECHNOLOGY
4,797,849
OFFICE SUPPLIES
4,402,186
NUMBER OF SALES BY SHIPPING MODE
4862
1590
1169
426
ECONOMY
ECONOMY PLUS
PRIORITY
IMMEDIATE
2017
2018
2019
2020
JANUARY
MAY
SEPTEMBER
FEBRUARY
JUNE
OCTOBER
MARCH
JULY
NOVEMBER
APRIL
AUGUST
DECEMBER

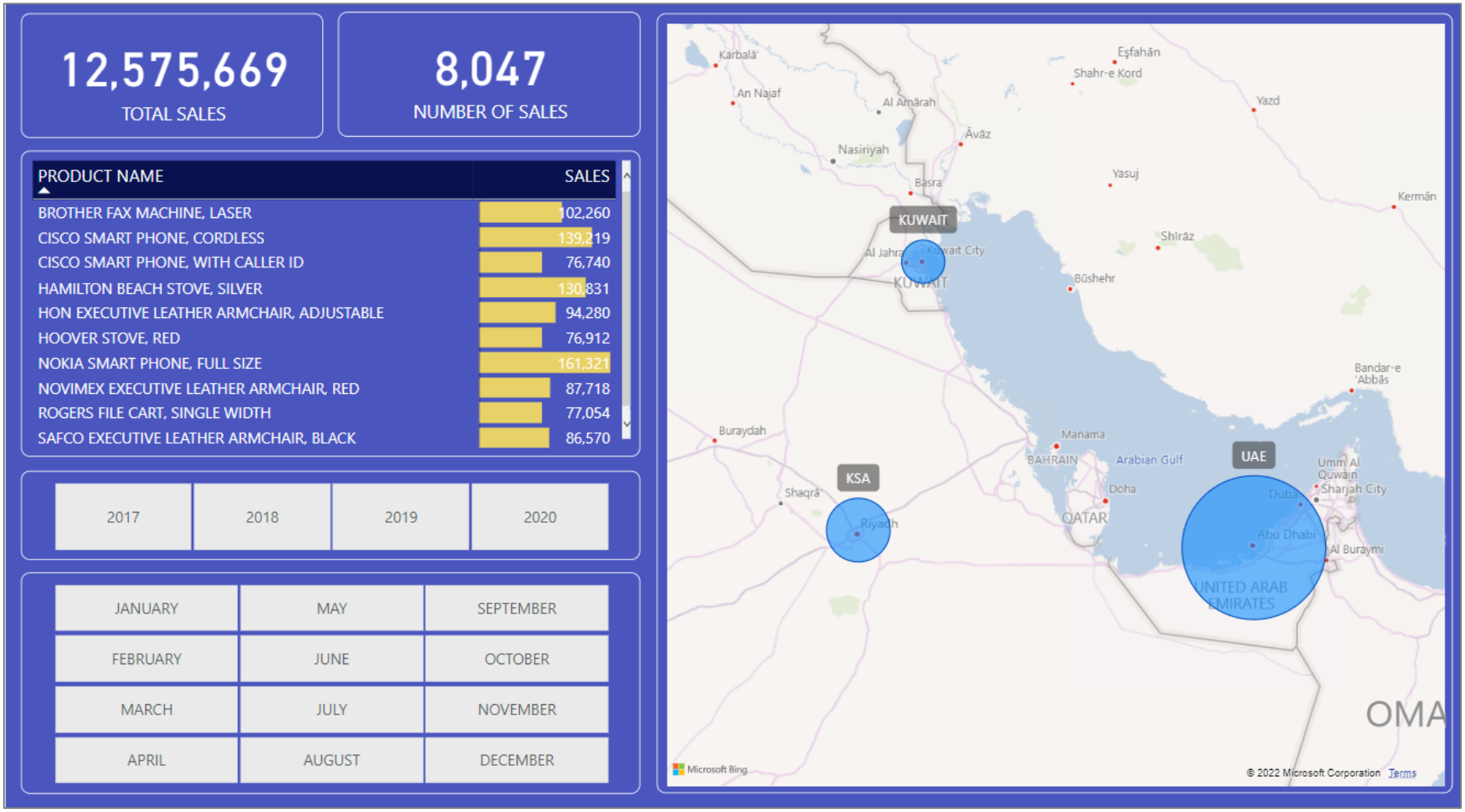
REPORT TWO NO SIDE BAR:



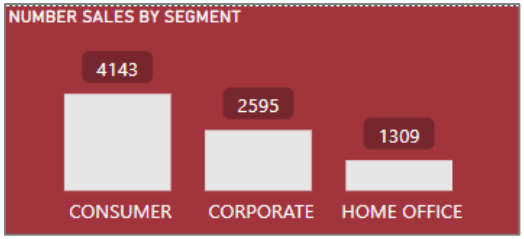
REPORT TWO WITH SIDE BAR:

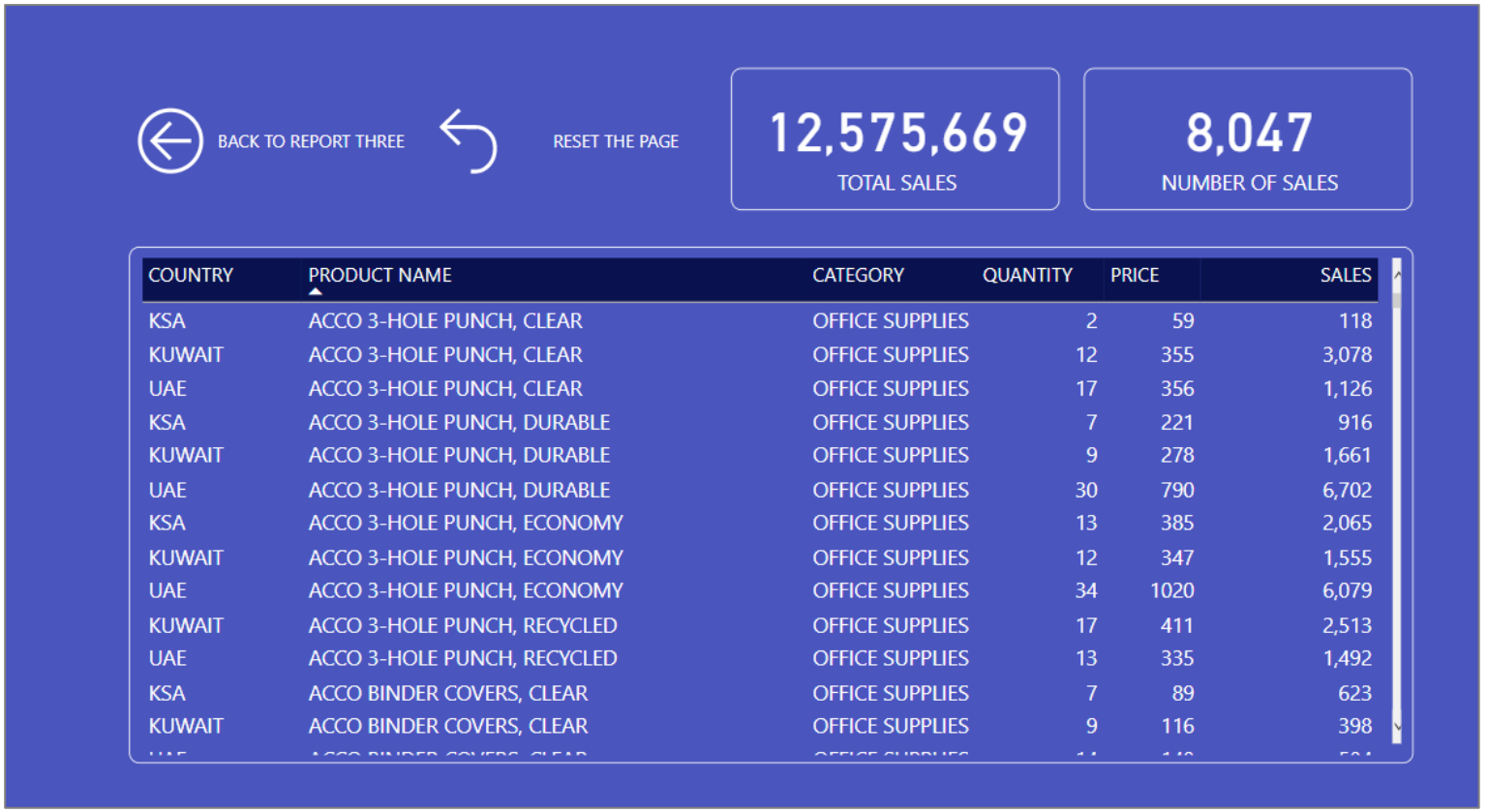


REPORT THREE:



TOOL TIP and DRILL-THROUGH PAGES





COUNTRY	PRODUCT NAME	CATEGORY	QUANTITY	PRICE	SALES
KSA	ACCO 3-HOLE PUNCH, CLEAR	OFFICE SUPPLIES	2	59	118
KUWAIT	ACCO 3-HOLE PUNCH, CLEAR	OFFICE SUPPLIES	12	355	3,078
UAE	ACCO 3-HOLE PUNCH, CLEAR	OFFICE SUPPLIES	17	356	1,126
KSA	ACCO 3-HOLE PUNCH, DURABLE	OFFICE SUPPLIES	7	221	916
KUWAIT	ACCO 3-HOLE PUNCH, DURABLE	OFFICE SUPPLIES	9	278	1,661
UAE	ACCO 3-HOLE PUNCH, DURABLE	OFFICE SUPPLIES	30	790	6,702
KSA	ACCO 3-HOLE PUNCH, ECONOMY	OFFICE SUPPLIES	13	385	2,065
KUWAIT	ACCO 3-HOLE PUNCH, ECONOMY	OFFICE SUPPLIES	12	347	1,555
UAE	ACCO 3-HOLE PUNCH, ECONOMY	OFFICE SUPPLIES	34	1020	6,079
KUWAIT	ACCO 3-HOLE PUNCH, RECYCLED	OFFICE SUPPLIES	17	411	2,513
UAE	ACCO 3-HOLE PUNCH, RECYCLED	OFFICE SUPPLIES	13	335	1,492
KSA	ACCO BINDER COVERS, CLEAR	OFFICE SUPPLIES	7	89	623
KUWAIT	ACCO BINDER COVERS, CLEAR	OFFICE SUPPLIES	9	116	398

BAHRAIN RETAIL COMPANY SALES REPORTS

Data File: BAHRAIN RETAIL COMPANY SALES.XLSX
Background color: #F9DD56
2nd Color: #666666

- REPORTS FEATURES
  - Cards.
  - Slicers.
  - Bookmarks & Bookmarks Buttons.
  - Data Color Conditional Formatting.
  - Bar Charts.
  - DAX
    - NEW COLUMNS
      - Sales Formula, Month Name, Month Number, and Year
    - MEASURES
      - Drill Button Text (the button text change based on the selection of items)
      - Drill Navigation (giving the ability to select two items from different charts)
      - Drill Report Text (when clicking the drill through a button – data are drilled to a table into different report page)
  - Ability to choose two items from two different Bar charts and Drillthrough using a button. Conditional DrillThrough.
  - Table

DAX FORMULAS

- **Sales Formula**
  SALE = SALES[SALE PRICE]*SALES[UNITS SOLD]

- **Month Name**
  MONTH NAME = UPPER(SALES[DATE].[Month])

- **Month Number**

  MONTH NUMBER = SALES[DATE].[MonthNo]

- **Year**

  YEAR = SALES[DATE].[Year]

- Drill Button Text (the button text change based on the selection of items)
  DRILL BUTTON TEXT =
  VAR _ISPRODUCTANDSEGMENTFILTERED= IF(AND(HASONEFILTER(SALES[PRODUCT]), HASONEFILTER(SALES[SEGMENT])),TRUE,FALSE)
  VAR _sPRODUCT= SELECTEDVALUE(SALES[PRODUCT],"ALL PRODUCTS")
  VAR _sSEGMENT= SELECTEDVALUE(SALES[SEGMENT],"ALL SEGMENTS")
  RETURN
  SWITCH(TRUE(),_ISPRODUCTANDSEGMENTFILTERED,"CLICK HERE TO SEE SALES DETAILS " & _sPRODUCT & " IN " & _sSEGMENT,"PLEASE SELECT A PRODUCT AND A SEGMENT TO DRILLTHROUGH")

- Drill Navigation (giving the ability to select two items from different charts)

  DRILL NAVIGATION =

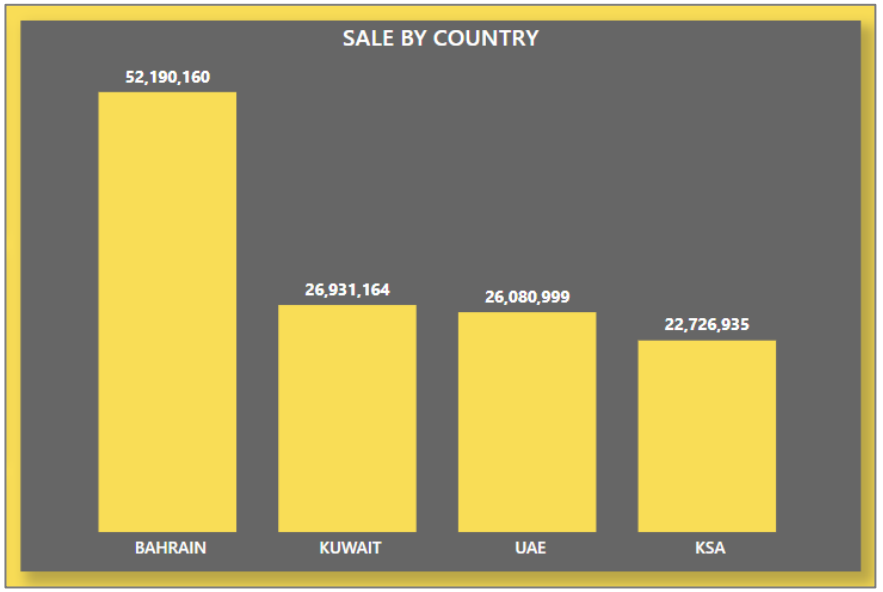
```
IF(AND (
        HASONEFILTER(SALES[PRODUCT]),
        HASONEFILTER(SALES[SEGMENT])),
        "SALES DETAILS","")
```

DRILL REPORT TEXT =

// Drill Report Text (When clicking the drill through button - data are drilled to a table into different report page)

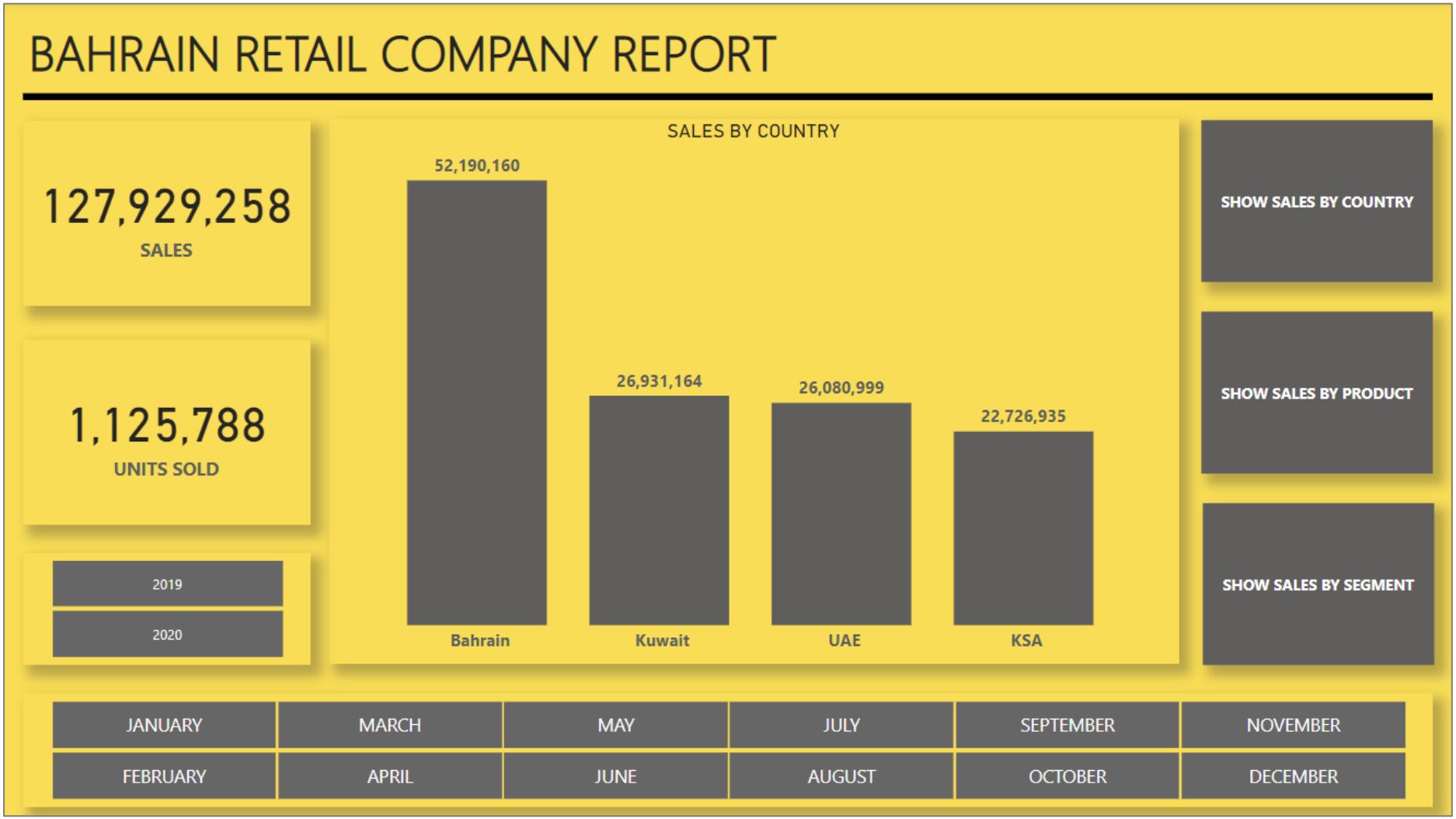
```
VAR _ISPRODUCTANDSEGEMENTFILTERED=IF(AND(HASONEFILTER(SALES[PRODUCT]),HASONEFILTER(SALES[SEGMENT])),TRUE,FALSE)
VAR _sPRODUCT=SELECTEDVALUE(SALES[PRODUCT],"ALL PRODUCTS")
VAR _sSEGMENT=SELECTEDVALUE(SALES[SEGMENT],"ALL SEGEMENTS")

RETURN

SWITCH(TRUE(),_ISPRODUCTANDSEGEMENTFILTERED,"SALES DETAILS" & _sPRODUCT &" "^_sSEGMENT," ")
```

REPORT ONE FILTER



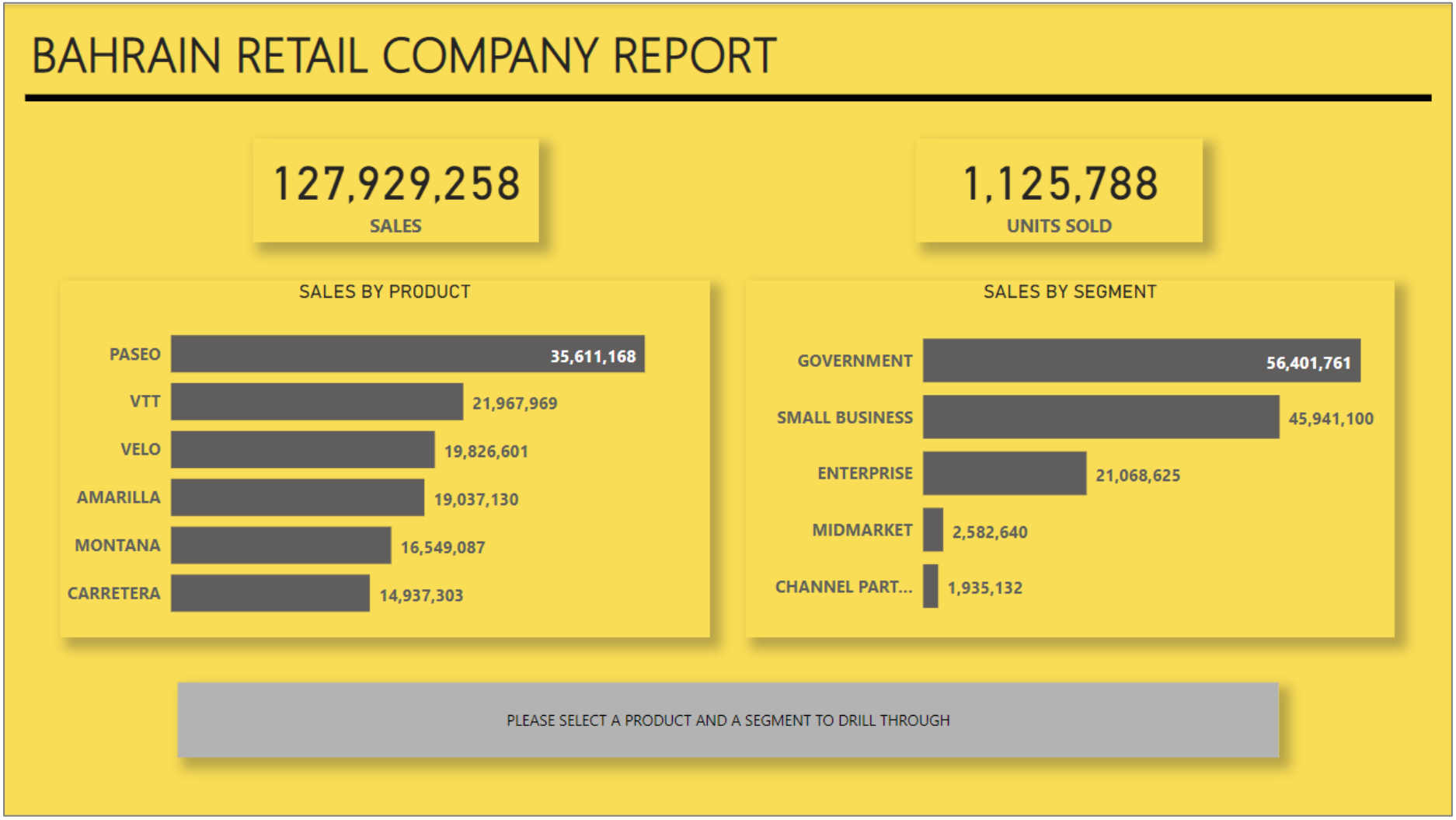
THE RESET FILTER BUTTON SHOULD SHOW SALES BY COUNTRY WITH NO FILTER. THE SHOW SALES BY COUNTRY IS THE SAME AS THE ABOVE COLUMN CHART. THE **SHOW SALES BY SEGMENT BUTTON** SHOULD CHANGE THE CHART TO **SALES BY SEGMENT** AND **SHOW SALES BY PRODUCT** SHOULD CHANGE THE CHART TO SALES BY PRODUCT. ALL COLUMNS CHARTS SHOW HAVE DATA COLOR CONDITIONAL FORMATTING.

REPORT ONE PAGE

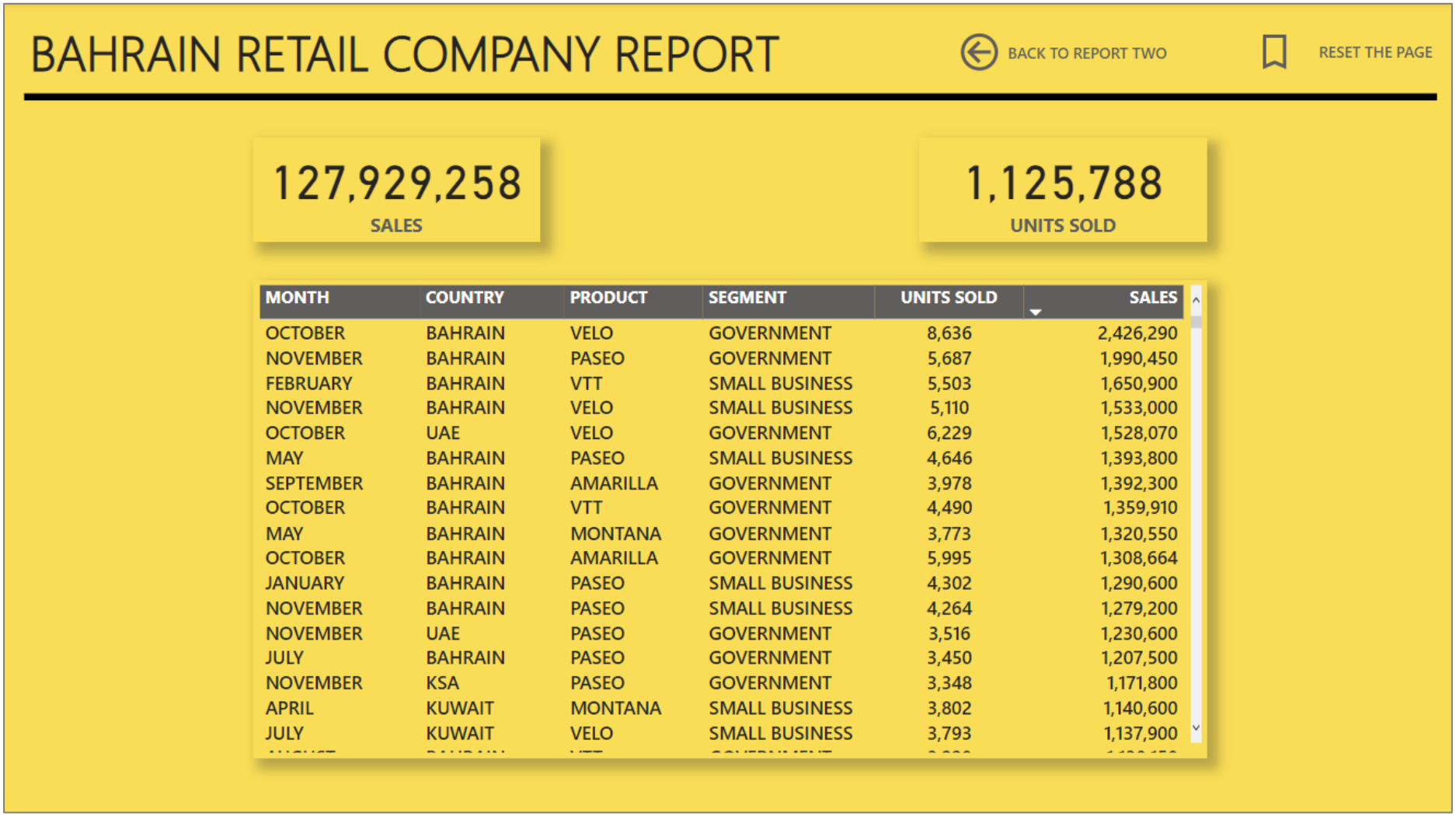


REPORT TWO PAGE

Only when you select a **product** and **segment** to drill-through button will be activated. Once you select a product and segment from the above to bar charts. Use the ctrl key when selecting two items from both charts.

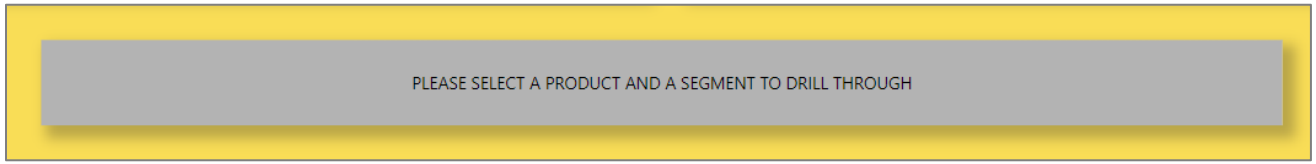


SALES DETAILS PAGE

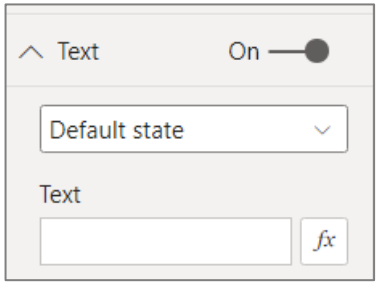


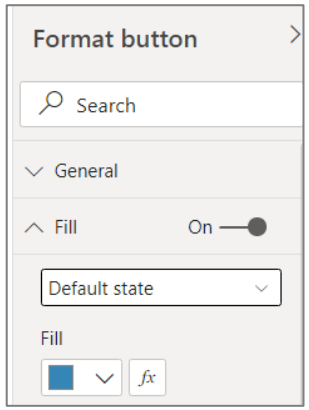
MONTH	COUNTRY	PRODUCT	SEGMENT	UNITS SOLD	SALES
OCTOBER	BAHRAIN	VELO	GOVERNMENT	8,636	2,426,290
NOVEMBER	BAHRAIN	PASEO	GOVERNMENT	5,687	1,990,450
FEBRUARY	BAHRAIN	VTT	SMALL BUSINESS	5,503	1,650,900
NOVEMBER	BAHRAIN	VELO	SMALL BUSINESS	5,110	1,533,000
OCTOBER	UAE	VELO	GOVERNMENT	6,229	1,528,070
MAY	BAHRAIN	PASEO	SMALL BUSINESS	4,646	1,393,800
SEPTEMBER	BAHRAIN	AMARILLA	GOVERNMENT	3,978	1,392,300
OCTOBER	BAHRAIN	VTT	GOVERNMENT	4,490	1,359,910
MAY	BAHRAIN	MONTANA	GOVERNMENT	3,773	1,320,550
OCTOBER	BAHRAIN	AMARILLA	GOVERNMENT	5,995	1,308,664
JANUARY	BAHRAIN	PASEO	SMALL BUSINESS	4,302	1,290,600
NOVEMBER	BAHRAIN	PASEO	SMALL BUSINESS	4,264	1,279,200
NOVEMBER	UAE	PASEO	GOVERNMENT	3,516	1,230,600
JULY	BAHRAIN	PASEO	GOVERNMENT	3,450	1,207,500
NOVEMBER	KSA	PASEO	GOVERNMENT	3,348	1,171,800
APRIL	KUWAIT	MONTANA	SMALL BUSINESS	3,802	1,140,600
JULY	KUWAIT	VELO	SMALL BUSINESS	3,793	1,137,900

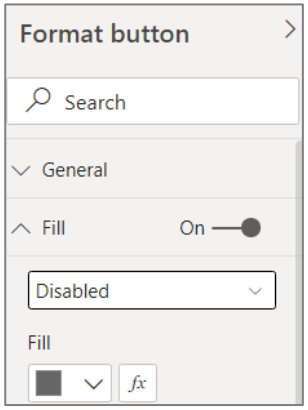
CONFIGURING THE CONDITIONAL DRILLTHROUGH BUTTON ON THE REPORT TWO PAGE.



- Select the Button
- On Visualization Select Format, Text
- Click **fx**
- Choose – Default state
- Text – Click **fx**
- Based on the field – Choose **DRILL BUTTON TEXT** measure
- Switch on Action
- Under Action Type Choose Drill through
- Click **fx**
- Based on the field – choose **DRILL NAVIGATION** measure

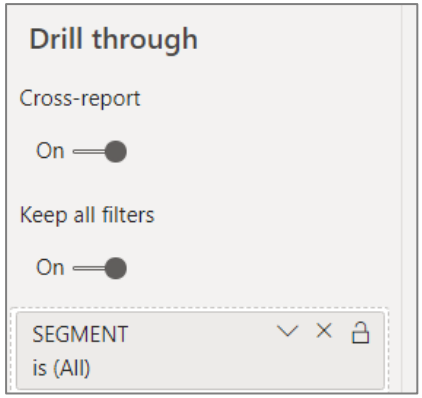






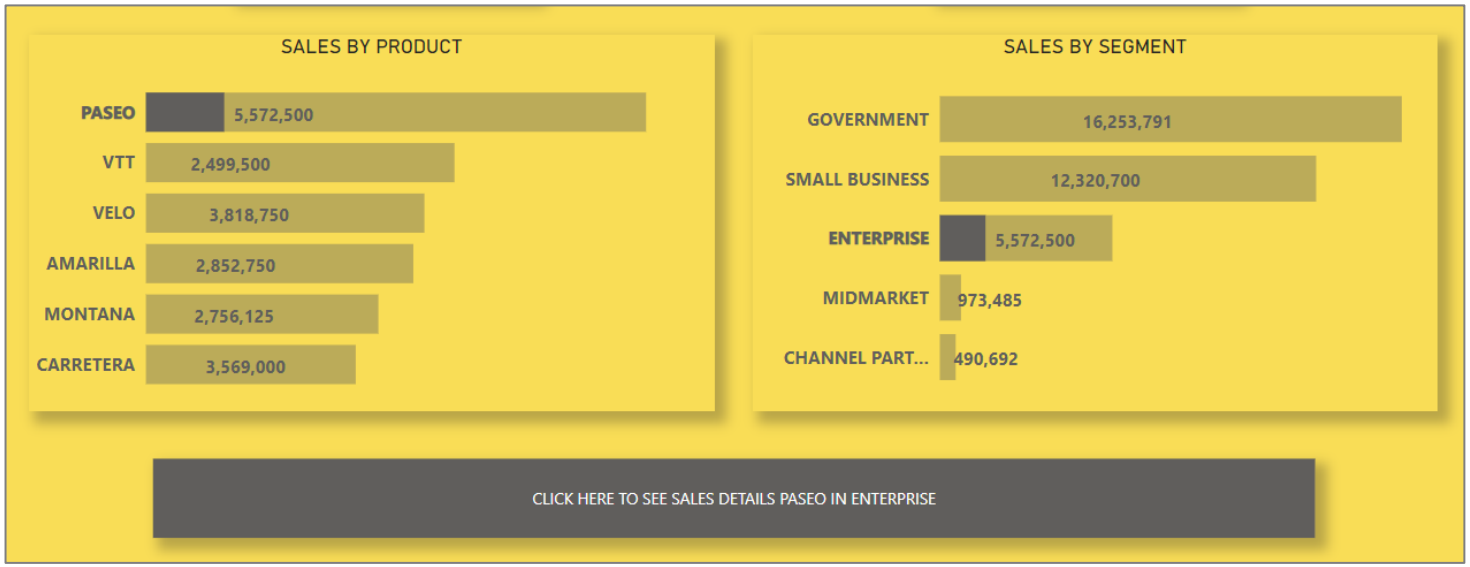
THE SALES DETAILS PAGE

- Switch On Cross-report
- Drag SEGMENT or PRODUCT filed to Add drill-through fields here.



TESTING THE CONDITIONAL DRILL-THROUGH

- On Report Two Page
- Select a Product from the Sales By Product Chart.
- Press and Hold CTRL key
- Select a Segment from Sales By Segment Chart.
- Press and Hold CTRL key
- Click the Conditional Button to drill through to Sales Details Page.



THE LOANS ANALYSIS REPORT 2017 – 2021

Data File:	LOAN RECORDS 2017 - 2021.xlsx
Background Colors:	COVER PAGE.PNG
	HIGH LEVEL.PNG
	DETAILED.PNG
	PURPOSE.PNG
	OVERVIEW.PNG
1st Color:	#20625C
2nd Color:	#EB895F

BUSINESS QUESTIONS – THESE ARE A FEW REASONS FOR CREATING THE REPORTS FOR ANALYSIS.

- Total Loan Amounts 2015 – 2019
- Number of Loans 2015 – 2019
- Loan Amount by Purpose
- Number of Loans by Purpose
- Total Late Fees, Recovered Fees, and Collection Fees
- Total Loans Amount that is fully paid
- Total Loans Amount that is charged off

DESIGNING THE REPORTS – 5 PAGES

- COVER PAGE
    - Show the Bank Name and the Report Title.

- HIGH LEVEL
    - Card: Loan Amount
    - Card: Total Payments Received
    - Card: Total Interest Received
    - Bar Cart: Number of Loans Per Year
    - Bar Chart: Total Loans Amounts Per Year
    - Bar Chart: Total Loans Amounts By Branch
    - Slicer: Loan Purpose.

- DETAILS
    - Bar Chart: Total Loan Amount By Purpose
    - Card: Highest Loan Amount
    - Card: Lowest Loan Amount
    - Card: Average Loan Amount
    - Card: Total Paid Loans
    - Card: Total Amount of Charged Off Loans
    - Card: Total Recovered Amount
    - Card: Total Late Fees Amount
    - Card: Total Collection Fees Amount
    - Slicer: By Branch
    - Slicer: By Date (slider)

- PURPOSE
    - Card: Total Loan Amount
    - Card: Total Payments Received
    - Card: Total Interest Received

- Card: Highest Loan Amount
- Card: Lowest Loan Amount
- Card: Average Loan Amount
- Card: Total Charged Off Loans
- Card: Number of Charged Off Loans
- Card: Total Recovered Fees
- Card: Total Paid Loans
- Card: Number of Paid Loans
- Card: Total Recoveries Fees
- Card: Number of Recoveries
- Card: Number of Late Fees
- Card: Number of Collection Fees
- 2 Slicers: By Year and By Purpose.

- OVERVIEW
  - Ribbon Chart: Number of Paid and Charged Off Loans over the Years
  - Slicer: By Purpose.

CUSTOM COLUMN

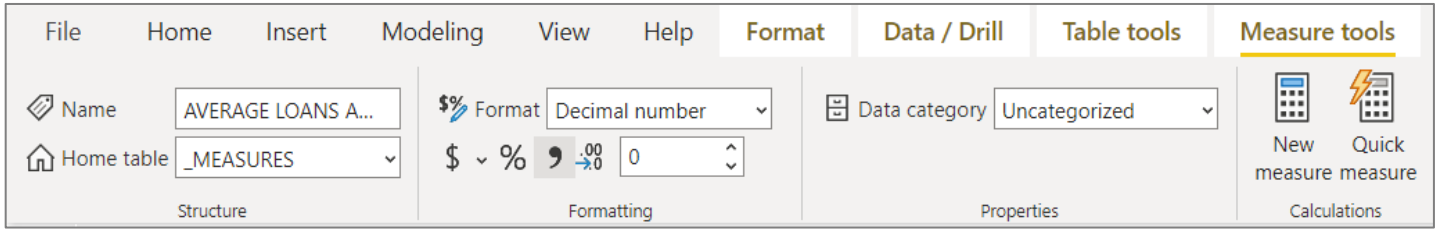
YEAR=LOANS[ISSUE DATE].[Year]

MEASURES

- Create a virtual table to hold all the measures
- Name the Table as **_MEASURES**
- Place all Measures into _MEASURES virtual table.
- Format all Measures:

    - TOTALS MEASURES as decimals, 0 Decimals with a comma after 1000
    - NUMBERS MEASURES as Whole Numbers, 0 Decimals with a comma after 1000

- Measures can be formatted using the Measure Tools Tab



MEASURES

TOTAL LOANS AMOUNT = SUM(LOANS[LOAN AMOUNT])

NUMBER OF LOANS = COUNT(LOANS[LOAN AMOUNT])

AVERAGE LOANS AMOUNT = AVERAGE(LOANS[LOAN AMOUNT])

HIGHEST LOANS AMOUNT = MAX(LOANS[LOAN AMOUNT])

LOWEST LOANS AMOUNT = MIN(LOANS[LOAN AMOUNT])

TOTAL RECOVIERIES FEES = SUMX(LOANS,LOANS[RECOVERIES])

NUMBER OF RECOVIERIES FEES = COUNTX(LOANS,LOANS[RECOVERIES])

TOTAL CHARGED OFF LOANS = CALCULATE(SUM(LOANS[LOAN AMOUNT]),LOANS[LOAN STATUS] ="Charged Off")

NUMBER OF CHARGED OFF LOANS = CALCULATE(COUNT(LOANS[LOAN AMOUNT]),LOANS[LOAN STATUS] = "Charged Off")

TOTAL COLLECTION FEES = SUMX(LOANS,LOANS[COLLECTION FEES])

NUMBER OF COLLECTION FEES = COUNTX(LOANS,LOANS[COLLECTION FEES])

TOTAL LATE FEES = SUMX(LOANS,LOANS[RECEIVED LATE FEES])

NUMBER OF LATE FEES = COUNTX(LOANS,LOANS[RECEIVED LATE FEES])

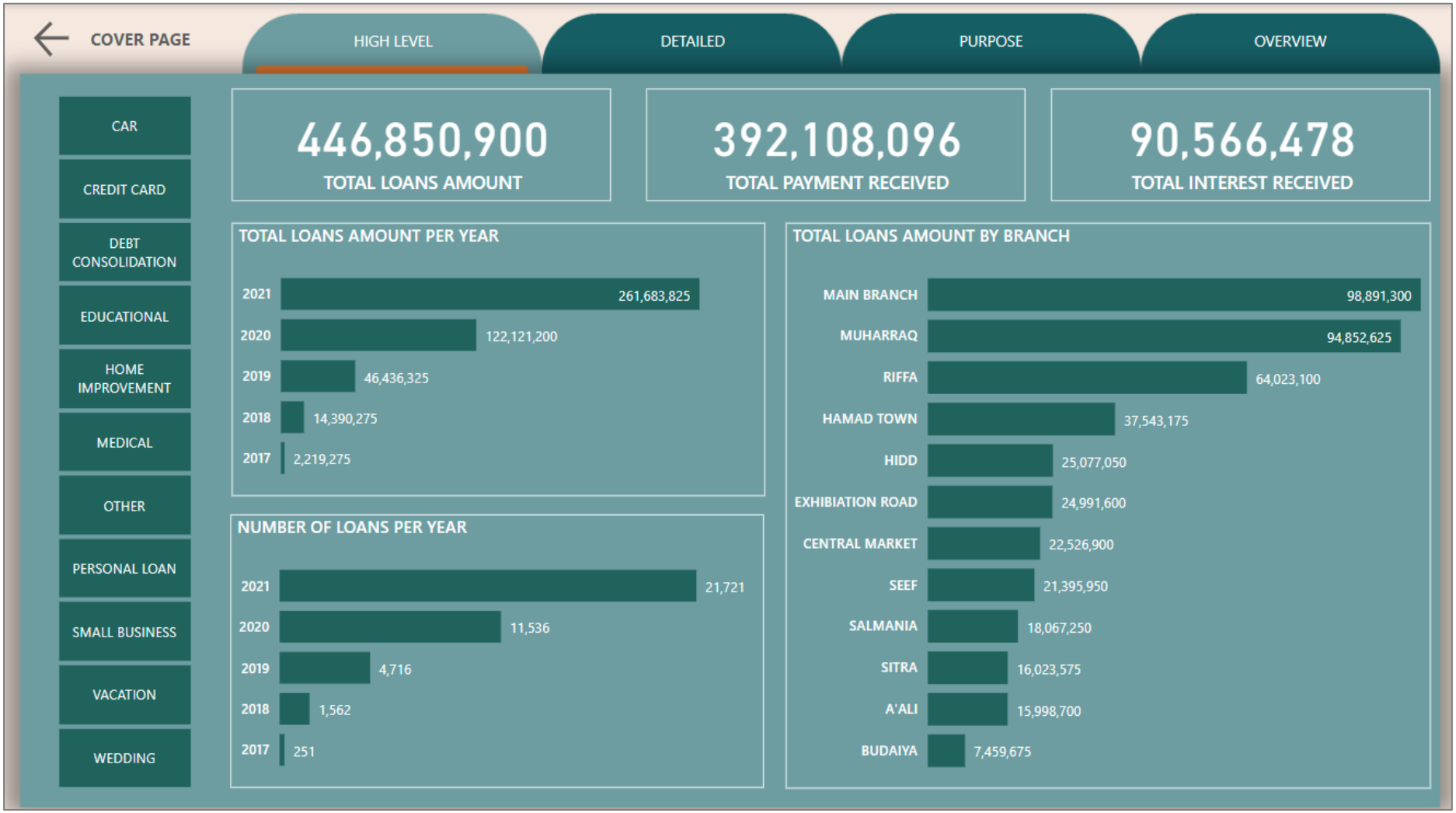
TOTAL PAID LOANS = CALCULATE(SUM(LOANS[LOAN AMOUNT]),LOANS[LOAN STATUS] ="Fully Paid")

NUMBER OF PAID LOANS = CALCULATE(COUNT(LOANS[LOAN AMOUNT]),LOANS[LOAN STATUS] ="Fully Paid")

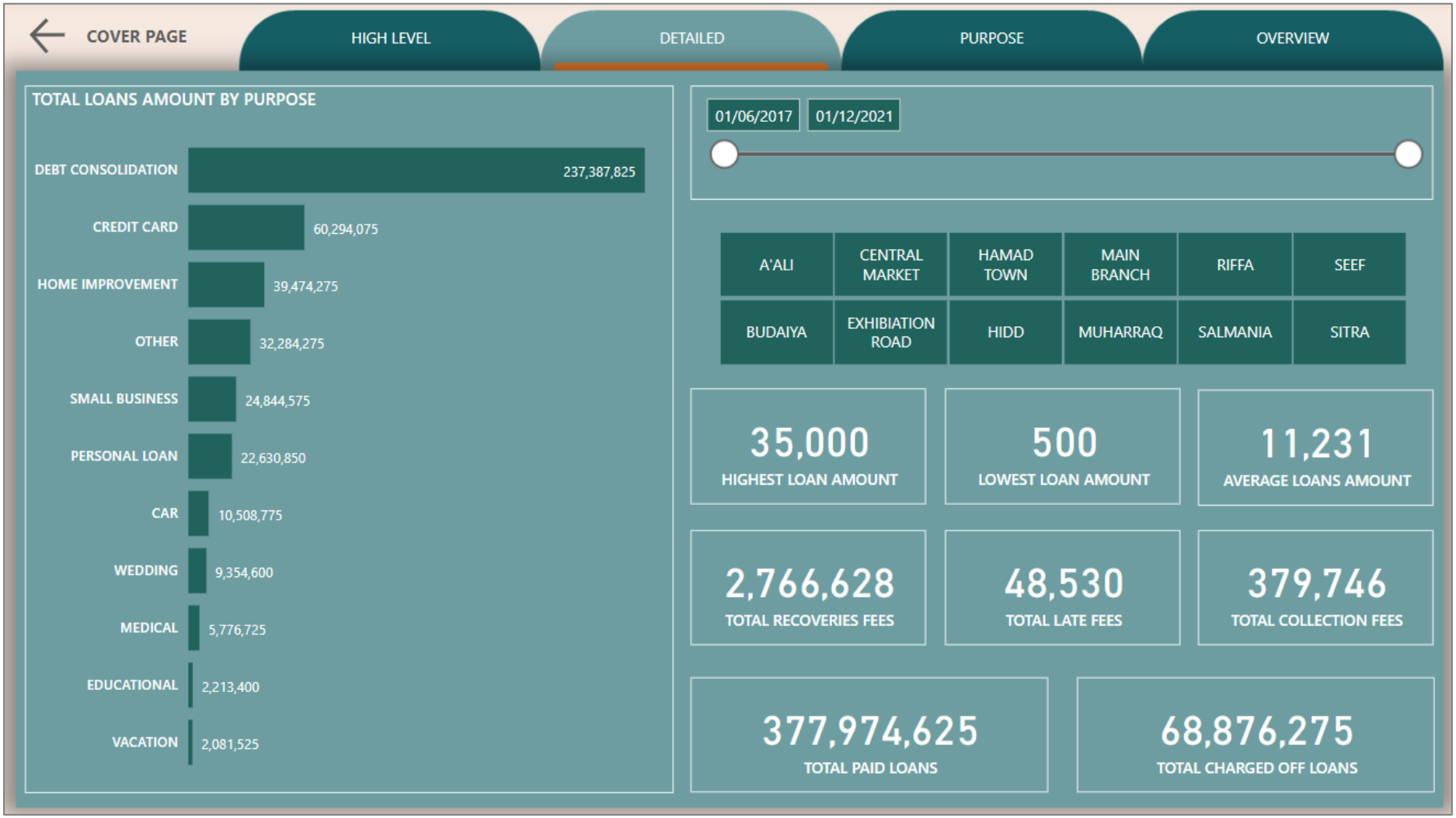
COVER PAGE

NATIONAL BANK
LOANS ANALYSIS 2017 - 2021
HIGH LEVEL
DETAILED
PURPOSE
OVERVIEW

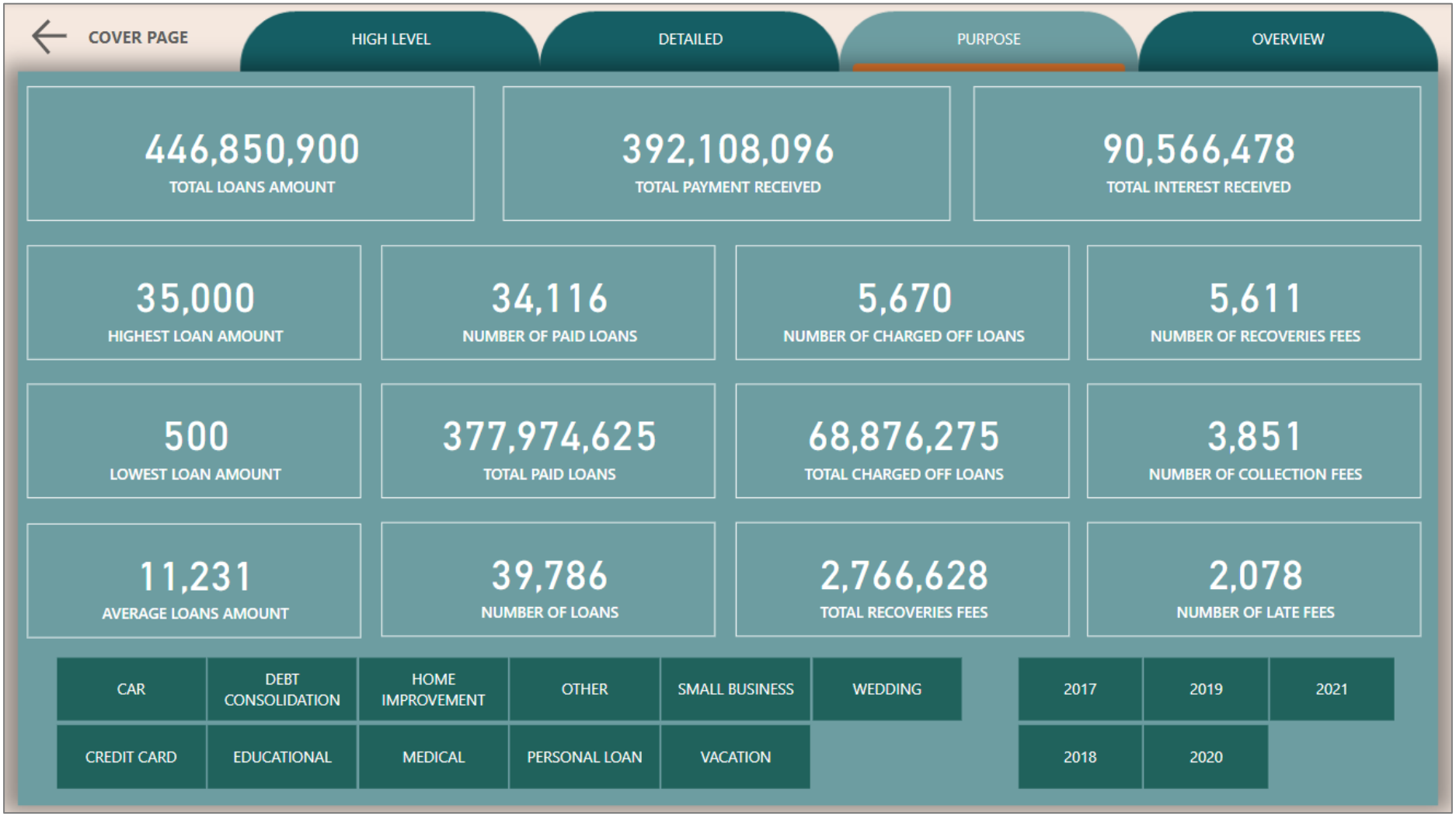
HIGH-LEVEL REPORT PAGE



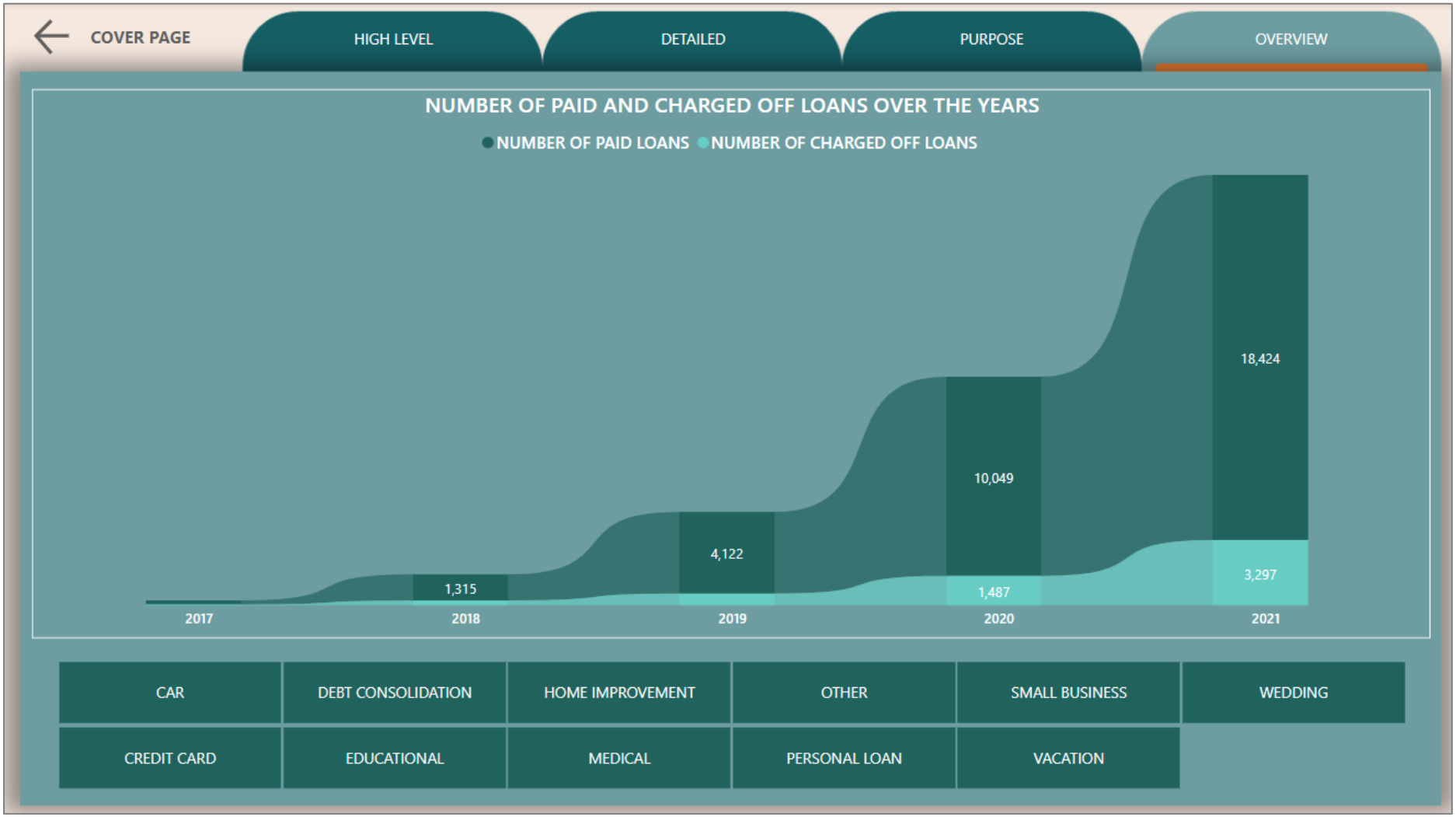
DETAILED REPORT PAGE



PURPOSE REPORT PAGE



OVERVIEW REPORT PAGE



UAE WHOLE SALES REPORT

Data File Name:	UAE WHOLE SALES DATA.CSV
	UAE WHOLE SALES - COVER PAGE.PNG
	UAE WHOLE SALES - BLANK.PNG
1st Color:	#0D6ABF
2nd Color:	#094780
3rd Color:	#41A4FF
4th Color:	#0E1A77

UAE Whole Sales is a company based in the United Arab Emirates and their business is the distribution of goods around the gulf countries. The company produced its sales data for the past nine years 2012 – 2020 and would like to produce a report using Power BI for analysis. The report is as follow:

- COVER PAGE
- HIGH LEVEL
- NUMBERS
- SALES
- PROFIT

All Pages as Driven by a button that is used for jumping between pages.

The Draft Reports as shown below along with all the measures that need to be created.

- Save the Final Report as UAE WHOLE SALES REPORT

CUSTOM COLUMN TO BE CREATED

- **SALES** = SALES[UNITS SOLD]*SALES[UNIT PRICE]
- **COSTS** = SALES[UNITS SOLD]*SALES[UNIT COST]
- **PROFIT** = SALES[SALES]-SALES[COSTS]
- **PROFIT SIZE** = SWITCH(TRUE(),SALES[PROFIT]>=10000,"HIGH PROFIT", SALES[PROFIT]>=5000,"MEDIUM PROFIT",SALES[PROFIT]<5000,"LOW PROFIT")
- **ORDER YEAR** = SALES[ORDER DATE].[Year]

MEASURES

COUNTRIES NUMBER OF ORDERS

BAHRAIN ORDERS = CALCULATE(COUNT('SALES'[SALES]), 'SALES'[COUNTRY]="BAHRAIN")
KSA ORDERS = CALCULATE(COUNT('SALES'[SALES]), 'SALES'[COUNTRY]="KSA")
KUWAIT ORDERS = CALCULATE(COUNT('SALES'[SALES]), 'SALES'[COUNTRY]="KUWAIT")
OMAN ORDERS = CALCULATE(COUNT('SALES'[SALES]), 'SALES'[COUNTRY]="OMAN")
QATAR ORDERS = CALCULATE(COUNT('SALES'[SALES]), 'SALES'[COUNTRY]="QATAR")

COUNTRIES TOTAL PROFIT

BAHRAIN PROFIT = CALCULATE(SUM('SALES'[PROFIT]), 'SALES'[COUNTRY]="BAHRAIN")
KSA PROFIT = CALCULATE(SUM('SALES'[PROFIT]), 'SALES'[COUNTRY]="KSA")
KUWAIT PROFIT = CALCULATE(SUM('SALES'[PROFIT]), 'SALES'[COUNTRY]="KUWAIT")
OMAN PROFIT = CALCULATE(SUM('SALES'[PROFIT]), 'SALES'[COUNTRY]="OMAN")

QATAR PROFIT = CALCULATE(SUM('SALES'[PROFIT]), 'SALES'[COUNTRY]="QATAR")
COUNTRIES TOTAL SALES

BAHRAIN SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[COUNTRY]="BAHRAIN")
KSA SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[COUNTRY]="KSA")
KUWAIT SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[COUNTRY]="KUWAIT")
OMAN SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[COUNTRY]="OMAN")
QATAR SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[COUNTRY]="QATAR")

ORDER PRIORITY

NUMBER OF CARGO ORDER PRIORITY = CALCULATE(COUNT(SALES[ORDER ID]),SALES[ORDER PRIORITY]="CARGO")
NUMBER OF HIGH ORDER PRIORITY = CALCULATE(COUNT(SALES[ORDER ID]),SALES[ORDER PRIORITY]="HIGH")
NUMBER OF LOW ORDER PRIORITY = CALCULATE(COUNT(SALES[ORDER ID]),SALES[ORDER PRIORITY]="LOW")
NUMBER OF MEDIUM ORDER PRIORITY = CALCULATE(COUNT(SALES[ORDER ID]),SALES[ORDER PRIORITY]="MEDIUM")

PROFIT SIZE

HIGH PROFIT SIZE = CALCULATE(SUM(SALES[PROFIT]),SALES[PROFIT SIZE]="HIGH PROFIT")
LOW PROFIT SIZE = CALCULATE(SUM(SALES[PROFIT]),SALES[PROFIT SIZE]="LOW PROFIT")
MEDIUM PROFIT SIZE = CALCULATE(SUM(SALES[PROFIT]),SALES[PROFIT SIZE]="MEDIUM PROFIT")

SALES CHANNEL

APP PROFIT = CALCULATE(SUM('SALES'[PROFIT]), 'SALES'[SALES CHANNEL]="APP")
APP SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[SALES CHANNEL]="APP")
NUMBER OF APP ORDERS = CALCULATE(COUNT(SALES[ORDER ID]),SALES[SALES CHANNEL]="APP")
NUMBER OF ONLINE ORDERS = CALCULATE(COUNT(SALES[ORDER ID]),SALES[SALES CHANNEL]="ONLINE")
ONLINE PROFIT = CALCULATE(SUM(SALES[PROFIT]),SALES[SALES CHANNEL]="ONLINE")
ONLINE SALES = CALCULATE(SUM('SALES'[SALES]), 'SALES'[SALES CHANNEL]= "ONLINE" }

TOTALS AND NUMBERS

TOTAL COSTS = SUM(SALES[COSTS])
TOTAL NUMBER OF ORDERS = COUNT(SALES[SALES])
TOTAL PROFIT = SUM(SALES[PROFIT])
TOTAL SALES = SUM(SALES[SALES])

COVER PAGE

UAE WHOLE SALES
ANALYSIS REPORT
2012 - 2020
COVER PAGE
HIGH LEVEL
SALES
NUMBERS
PROFITS

HIGH-LEVEL REPORT PAGE

SALES REPORT PAGE

NUMBERS REPORT PAGE

PROFIT REPORT PAGE

DAX REFERENCE

DAX – **D**ata **A**nalysis **E**xpression is a programming language that is used throughout Microsoft Power BI for creating calculated columns, measures, and custom tables. It is a collection of functions, operators, and constants that can be used in a formula, or expression, to calculate and return one or more value.

DAX OPERATORS REFERENCE

ARITHMETICS OPERATORS

Arithmetic Operators	Measing	Example
+	Addition	2 + 7
-	Subtraction	5 - 3
*	Multiplication	3 * 6
/	Division	8 / 2
^	Exponent	2 ^ 5

COMPARISON OPERATORS

Comparison Operators	Measing	Example
=	Equal to	[Location]=”Zallaq”
>	Greater than	[Quantity] > 10
<	Less than	[Quantity] < 10
>=	Greater than or equal to	[Unit Price] >= 2.8
<=	Less than or equal to	[Unit Price] <= 2.8
<>	Not equal to	[Location] <> ”Manama”

TEXT/LOGICAL OPERATORS

Text/Logical Operators	Meaning	Example
&	Concatenate two values to produce one string	[Country] &” “ & [City]
&&	Create an AND condition between two logical expressions	([Store]=”Riffa”) && ([Qty]>10)
|| (double pipe)	Create an OR condition between two logical expressions	([City]=”Riffa” || ([City] = “Sitra”)
IN	Create a logical OR condition based on a given list {using curly brackets}	‘Store Lookup’[City] IN {“Riffa”, “Sitra” , “Seef”}

COMMON DAX FUNCTIONS CATEGORIES

MATH & STATS Functions	LOGICAL Functions	TEXT Finctions	FILTER Finctions	DATE & TIME Finctions
Basic **aggregation** functions as well as "**iterators**" evaluated at the row-level	Functions for returning information about values in a given **conditional Expression**	Functions to manipulate **text strings** or **control formats** for dates, times, or numbers	**Lookup** functions based on related tables and **filtering** functions for dynamic calculations	Basic **date and time** functions as well as advanced **time intelligence** operations
Common Examples: • SUM • AVERAGE • MAXIMUM • **DIVIDE** • **COUNT**/COUNTA • **COUNTROWS** • DISCTINCTCOUNT **Iterator Functions** • **SUMX** • AVERAGEX • MAXX/MINX • **RANKX** • COUNTX	**Common Examples:** • **IF** • IFERROR • AND • OR • NOT • **SWITCH** • TRUE • FALSE	**Common Examples:** • CONCATENATE • **FORMAT** • LEFT/MID/RIGHT • **UPPER**/LOWER • PROPER • LEN • SEARCH/FIND • REPLACE • REPT • SUBSTITUTE • TRIM • UNICHAR	**Common Examples:** • **CALCULATE** • **FILTER** • **ALL** • ALLEXCEPT • **RELATED** • RELATEDTABLE • DISCTINCT • VALUES • EARLIER/EARLIEST • **HASONEVALUE** • **HASONEFILTER** • ISFILTERED • USERELATIONSHIP	**Common Examples:** • **DATEDIFF** • YEARFRAC • YEAR • MONTH • DAY • HOUR • MINUTE • SECOND • TODAY • NIW • WEEKDAY • WEEKNUM **Time Intelligence Functions:** • DATESYTD • DATESQTD • DATESMTD • DATEADD • DATESINPERIOD

Note: This is NOT a comprehensive list (does not include trigonometry functions, Information functions, or other less common functions.

THE DIFFERENCE BETWEEN CALCULATED COLUMN AND MEASURES

CALCULATED COLUMNS

Calculated columns allow you to add new, formula-based columns to tables.

- Calculated columns generate values for each row, which are visible within tables in the Data view.
- Use calculated columns when you want to "stamp" static, fixed values to each row in a table.

DO NOT use calculated columns for aggregation formulas, or to calculate fields for the "Values" area of a visualization (use measures instead). Calculated columns are typically used for filtering data, rather than creating numerical or aggregated values.

MEASURES

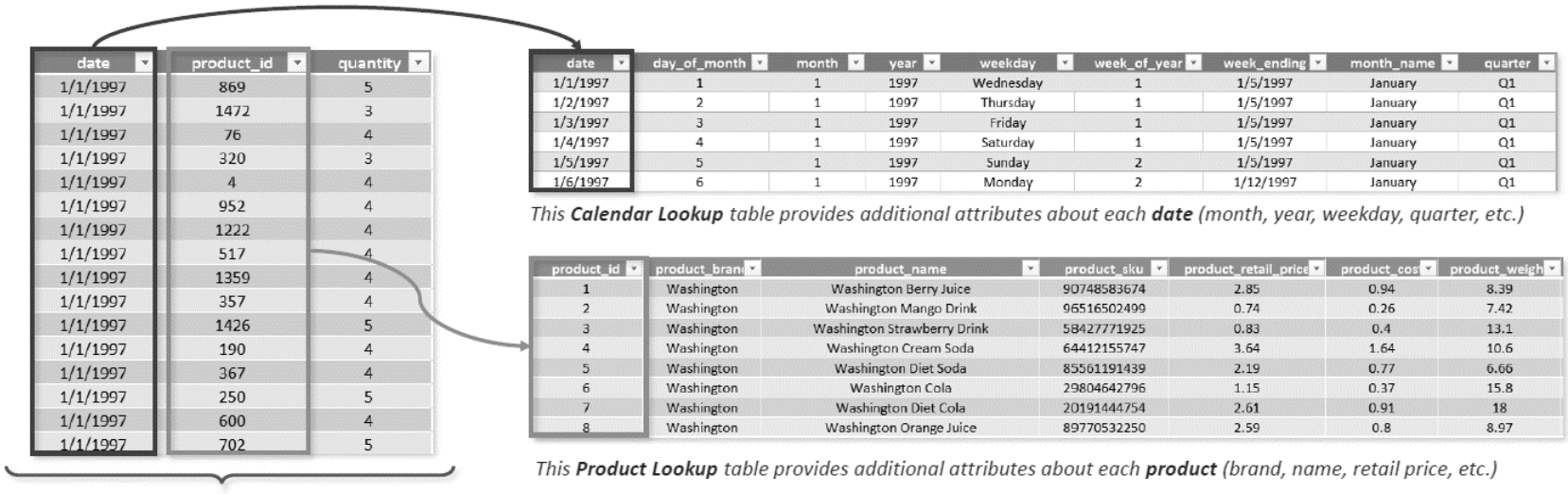
Measures are DAX formulas used to generate new calculated values.

- Like calculated columns, measures reference entire tables or columns.
- Unlike calculated columns, measure values are not visible within tables; they can only be "seen" within a visualization like a chart, car, or a matrix.
- Measures are evaluated based on filter context, which means they recalculate when the fields or filters around them.
- Use measures (vs. calculated columns) when a single row cannot give you the answer (in other words, when you need to **aggregate**)
- Use measures to create numerical, calculated values that can be analysed in the "values" field of a report visual

DATA TABLES VS. LOOKUP TABLES

Models generally contain two types of tables: **data** (or "fact") tables, and **lookup** (or "dimension") tables

- **Data tables** contain measurable values or metrics about the business (quantity, revenue, etc.)
- **Lookup tables** provide descriptive attributes about each dimension in your model (customers, products, etc.)



date	product_id	quantity
1/1/1997	869	5
1/1/1997	1472	3
1/1/1997	76	4
1/1/1997	320	3
1/1/1997	4	4
1/1/1997	952	4
1/1/1997	1222	4
1/1/1997	517	4
1/1/1997	1359	4
1/1/1997	357	4
1/1/1997	1426	5
1/1/1997	190	4
1/1/1997	367	4
1/1/1997	250	5
1/1/1997	600	4
1/1/1997	702	5

*This **Data Table** contains "**quantity**" values, and connects to lookup tables via the "**date**" and "**product_id**" columns*

date	day_of_month	month	year	weekday	week_of_year	week_ending	month_name	quarter
1/1/1997	1	1	1997	Wednesday	1	1/5/1997	January	Q1
1/2/1997	2	1	1997	Thursday	1	1/5/1997	January	Q1
1/3/1997	3	1	1997	Friday	1	1/5/1997	January	Q1
1/4/1997	4	1	1997	Saturday	1	1/5/1997	January	Q1
1/5/1997	5	1	1997	Sunday	2	1/5/1997	January	Q1
1/6/1997	6	1	1997	Monday	2	1/12/1997	January	Q1

*This **Calendar Lookup** table provides additional attributes about each **date** (month, year, weekday, quarter, etc.)*

product_id	product_brand	product_name	product_sku	product_retail_price	product_cost	product_weight
1	Washington	Washington Berry Juice	90748583674	2.85	0.94	8.39
2	Washington	Washington Mango Drink	96516502499	0.74	0.26	7.42
3	Washington	Washington Strawberry Drink	58427771925	0.83	0.4	13.1
4	Washington	Washington Cream Soda	64412155747	3.64	1.64	10.6
5	Washington	Washington Diet Soda	85561191439	2.19	0.77	6.66
6	Washington	Washington Cola	29804642796	1.15	0.37	15.8
7	Washington	Washington Diet Cola	20191444754	2.61	0.91	18
8	Washington	Washington Orange Juice	89770532250	2.59	0.8	8.97

*This **Product Lookup** table provides additional attributes about each **product** (brand, name, retail price, etc.)*

EVALUATION ORDER AND BASIC ITERATORS

EVALUATION ORDER

Evaluation order is the process by which DAX evaluates the parameters in a function.

- Individual functions typically evaluate from left-to-right, starting with the first parameter (followed by the second, third, etc.)
- Nested functions evaluate from the inside-out, starting with the inner most function and working outward from there.

Non-nested:

```
        1          2           3
=IF(LogicalTest, ResultIfTrue, [ResultIfFalse])
```

Nested:

```
=SUMX(
   FILTER(
      FILTER( 'Table',
         RELATED( 'Table'[Column]), 1
      RELATED( 'Table'[Column]), 2
   'Table'[Column]) 3
```

BASIC ITERATORS

SUMX Returns the sum of an expression evaluated for each row in a table

```
=SUMX(Table, Expression)
```

Aggregation to apply to calculated rows

Examples:

- *SUMX*
- *COUNTX*
- *AVERAGEX*
- *RANKX*
- *MAXX/MINX*

Table in which the expression will be evaluated

Examples:

- *'Sales by Store'*
- *FILTER(Sales, RELATED('Products'[Category])="Clothing")*

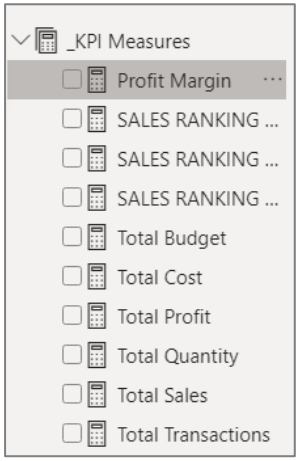
Expression to be evaluated for each row of the given table

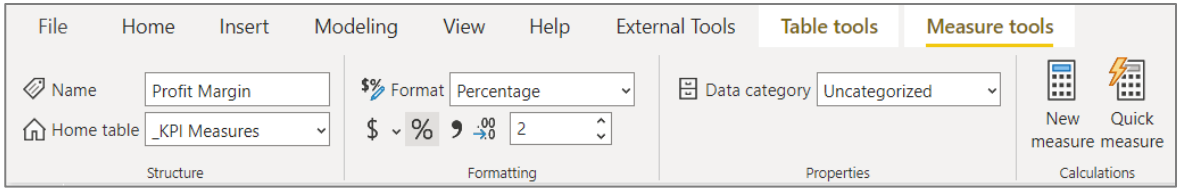
Examples:

- *[Total Orders]*
- *'Sales'[RetailPrice] * 'Sales'[Quantity]*

Imagine the function adding a temporary new column to the table, calculating the value in each row (based on the expression), and then applying the aggregation to that new column.

FORMATTING MEASURES





- Select the **Measure**.
- Click **Measuring Tools** Tab.
- Select the icons and format from the **Formatting Group**.

DAX FUNCTIONS - EXERCISES

DATA FILE: **DAX REFERENCE DATA.xlsx**

TRANSACTION	CUSTOMER	DATE	PRODUCT ID	BRANCH	DELIVERY CHARGES	DISCOUNT	QTY	PRICE	COST
TR0001470	MUSTAFA KAMAL	30/03/2021	PR228	SITRA	5		14	20	12
TR0001755	ZAKI YASEEN	11/08/2021	PR228	ARAD	5	50	8	20	12
TR0001050	MONA BAQER	27/02/2021	PR924	AMWAJ	8		5	30	15
TR0001810	NOOR YOUSIF	11/11/2021	PR122	SITRA	10		49	40	26
TR0001380		30/03/2021	PR490	ARAD	13	50	22	50	32
TR0001784	SHOOQ ABDULLA	19/08/2021	PR490	SITRA	13		9	50	32
TR0001478	FAREED ABDULLA	30/04/2021	PR757	ZALLAQ	15	64	86	60	35
TR0001888	KARIMA JAMAL	16/12/2021	PR166	AMWAJ	18		10	70	42
TR0001066	JASSIM HAMAD	14/03/2021	PR940	SITRA	23		54	90	60
TR0001711	KHULOOD ZEYAD	14/06/2021	PR940	AMWAJ	23		38	90	60
TR0001801	HAMDAN KHALIFA	07/09/2021	PR794	SITRA	25		77	100	78
TR0001227		20/03/2021	PR885	ZALLAQ	30	64	23	120	80
TR0001241	ABEER JOWHAR	21/03/2021	PR885	RIFFA	30		94	120	80
TR0001030	HAMED MOHAMME	07/02/2021	PR766	ARAD	38	50	89	150	115
TR0001543	FAJER SAEED	21/05/2021	PR766	ZALLAQ	38	64	21	150	115
TR0001661	KHALIL ABDEEN	13/06/2021	PR766	ARAD	38	50	33	150	115
TR0001026	ABDULLA EBRAHIM	03/02/2021	PR850	AMWAJ	40		77	160	90
TR0001014	SAMEERA AHMED	25/01/2021	PR850	ARAD	45	50	99	180	90
TR0001132	SAFIA KHALIL	17/03/2021	PR927	ZALLAQ	45	64	68	180	110
TR0001245	MARIMA ESSA	26/03/2021	PR927	RIFFA	45		28	180	110
TR0001716	NAYLA KHALID	07/07/2021	PR927	ARAD	45	50	4	180	110
TR0001358	SHAHEEN HUSSAIN	27/03/2021	PR481	ZALLAQ	48	64	70	190	120
TR0001618	EBRAHIM HASHIM	03/06/2021	PR702	ARAD	50	50	24	200	162
TR0001829	MOHAMMED ALI	13/09/2021	PR702	RIFFA	50		11	200	162

BRANCH	BRANCH BONUS
AMWAJ	15%
ARAD	13%
RIFFA	22%
SITRA	18%
ZALLAQ	26%

NOTES: COVER PAGE AND REPORTS PAGES ALREASY CREATED TO SPEED UP THE DESIGN.

CUSTOM COLUMNS

MONTH = UPPER(FORMAT(SALES[DATE],"mmmm"))

MONTH NUMBER = SALES[DATE].[MonthNo]

TOTAL SALES = SALES[PRICE]*SALES[QTY]

DELIVERY STATUS = IF(SALES[DELIVERY CHARGES]>30,"HIGH","NORMAL")

SALES STATUS = SWITCH(TRUE(),
[TOTAL SALES]>10000,"HIGH SALES",
[TOTAL SALES]>3000,"MEDIUM SALES",
"NORMAL SALES")

MEASURES

CURRENT DATE = TODAY()

TOTAL SALES = SUMX(SALES,SALES[PRICE]*SALES[QTY])

TOTAL COSTS = SUMX(SALES,SALES[COST]*SALES[QTY])

TOTAL BRANCHES BONUSES = SUMX(SALES,SALES[TOTAL SALES]*RELATED(BONUS[BRANCH BONUS]))

TOTAL DELIVERY CHARGES = SUM(SALES[DELIVERY CHARGES])

AMWAJ TOTAL SALES = CALCULATE([TOTAL SALES],SALES[BRANCH]="AMWAJ")

ZALLAQ TOTAL SALES = CALCULATE([TOTAL SALES],SALES[BRANCH]="ZALLAQ")

ARAD & RIFFA TOTAL SALES = CALCULATE([TOTAL SALES],SALES[BRANCH]="ARAD" ||SALES[BRANCH]="RIFFA")

SITRA & ZALLAQ TOTAL SALES = CALCULATE([TOTAL SALES], SALES[BRANCH] IN {"SITRA","ZALLAQ"})

AVERAGE DELIVERY CHARGES = AVERAGE(SALES[DELIVERY CHARGES])

AVERAGE TOTAL COST = AVERAGEX(SALES,SALES[QTY]*SALES[COST])

HIGHEST DELIVERY CHARGES = MAX(SALES[DELIVERY CHARGES])

LOWEST DELIVERY CHARGES = MIN(SALES[DELIVERY CHARGES])

NUMBER OF CUSTOMERS = COUNTX(SALES,SALES[CUSTOMER])

NUMBER OF TRANSACTIONS = COUNTROWS(SALES)

AVAILABLE CUSTOMER NAMES = CALCULATE(COUNTROWS(SALES),NOT ISBLANK(SALES[CUSTOMER]))

TOTAL PROFIT = [TOTAL SALES]-[TOTAL COSTS]

GROSS PROFIT MARGIN = DIVIDE([TOTAL COSTS],[TOTAL SALES])

BRANCHES TOTAL SALES RANKING = RANKX(ALL(SALES[BRANCH]),[TOTAL SALES],,ASC)

DELIVERY % OF TOTAL SALES = DIVIDE([TOTAL DELIVERY CHARGES],[TOTAL SALES],0)

ONE BRANCH IS SELECTED = UPPER(HASONEFILTER(SALES[BRANCH]))

ONE DELIVERY CHARGES IS SELECTED = SELECTEDVALUE(SALES[DELIVERY CHARGES],"MULTIPLE VALUES SELECTED")

WORKING WITH DAX - EXERCISES

07, Friday, January, 2022

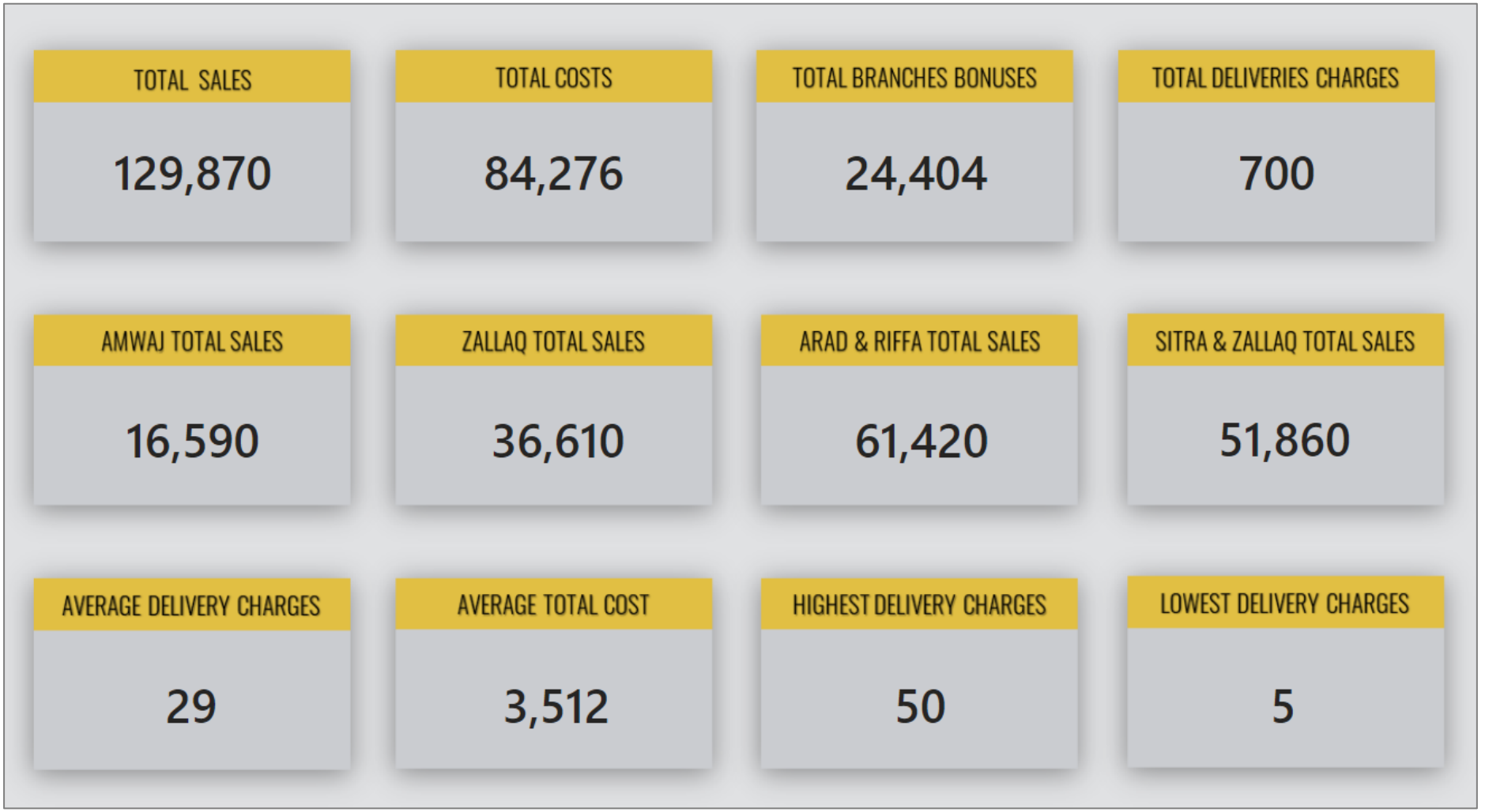
INSERT THE FOLLOWING COLUMNS

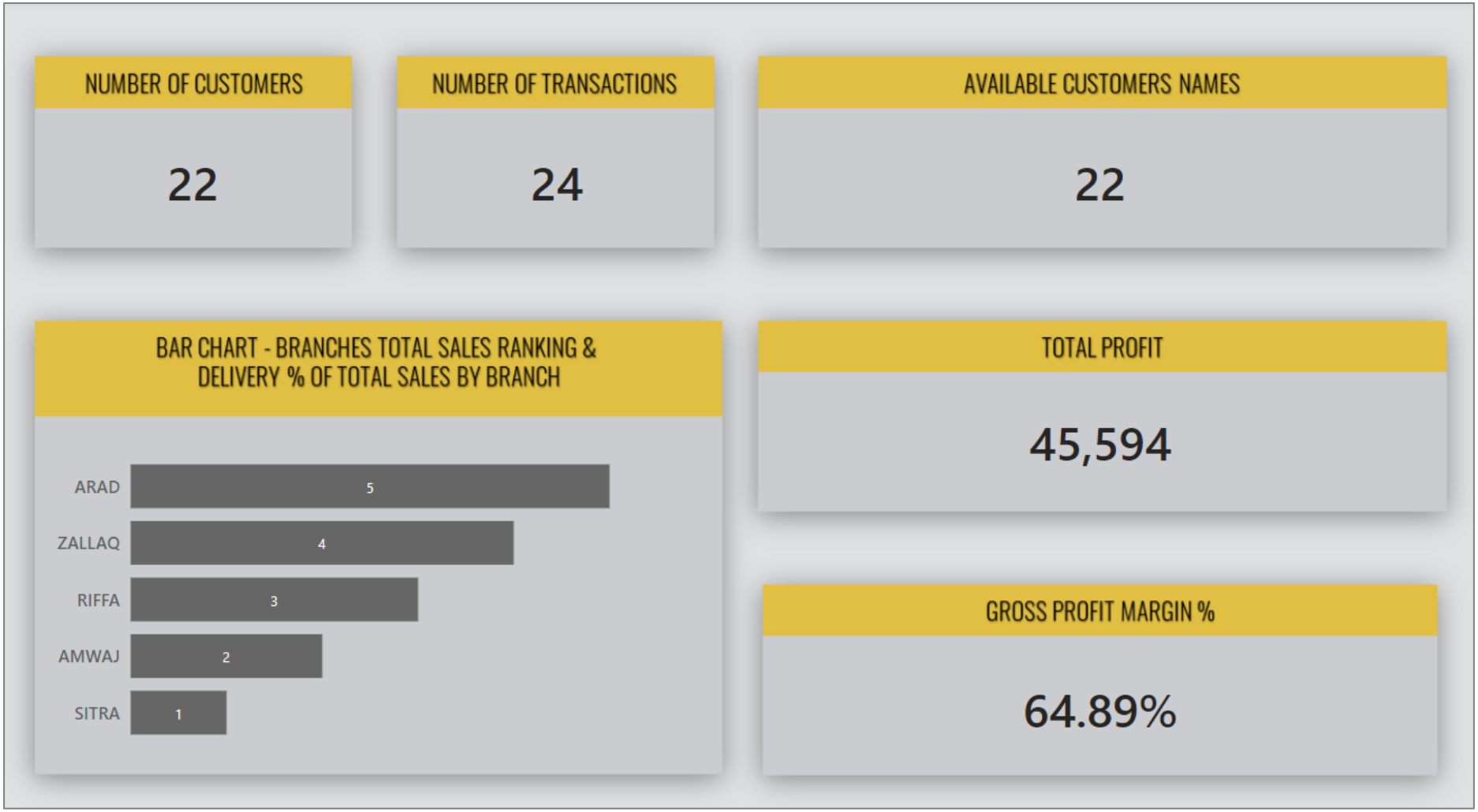
```
MONTH = UPPER(FORMAT(SALES[DATE],"MMMM"))
```

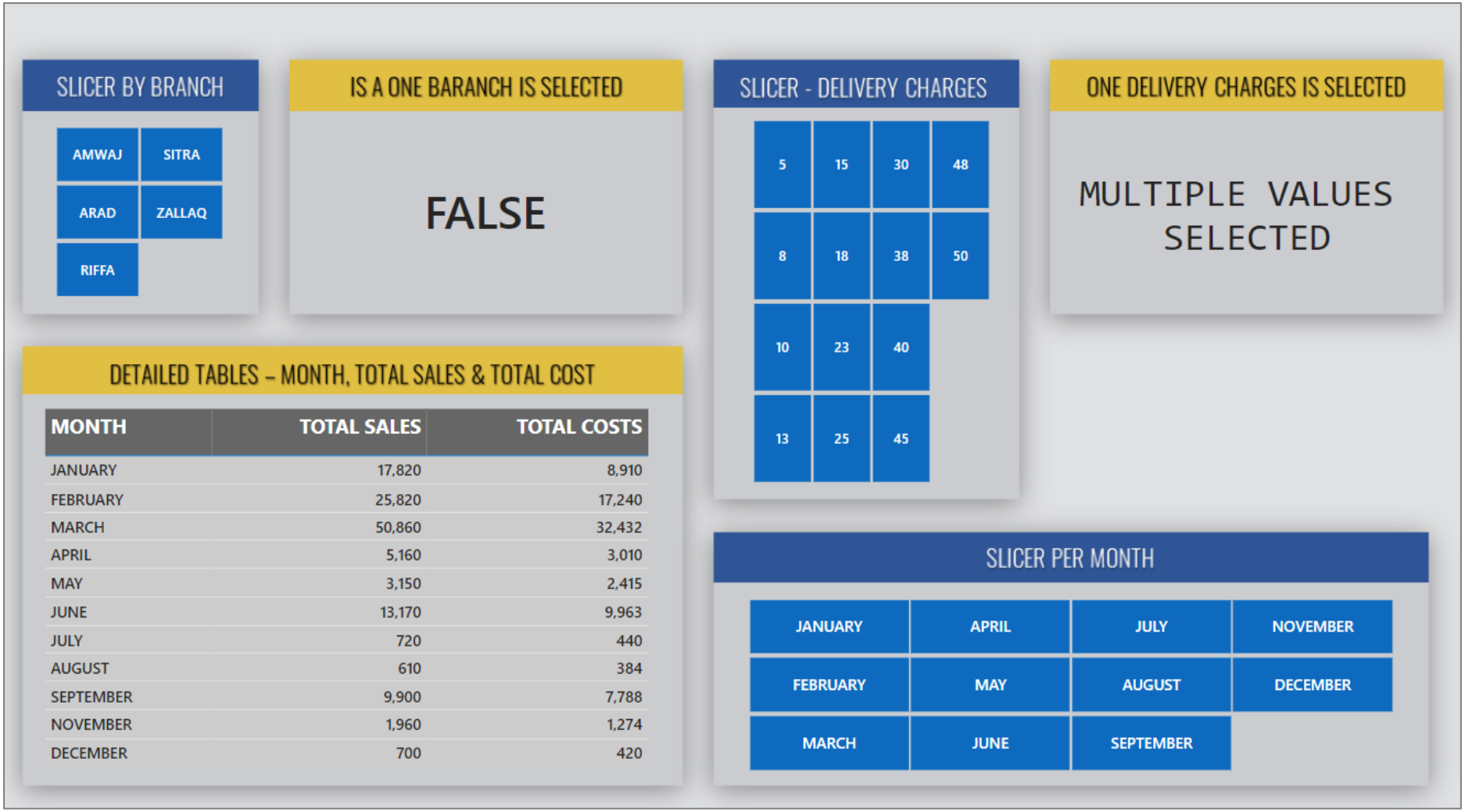
```
MONTH NUMBER = SALES[DATE].[MonthNo]
```

```
DELIVERY STATUS = IF(SALES[DELIVERY CHARGES]>30,"HIGH","NORMAL")
```

```
SALES STATUS = SWITCH(TRUE(),[TOTAL SALES]>10000,"HIGH SALES",[TOTAL SALES]>3000,"MEDIUM SALES","NORMAL SALES")
```


TOTAL SALES
129,870
TOTAL COSTS
84,276
TOTAL BRANCHES BONUSES
24,404
TOTAL DELIVERIES CHARGES
700
AMWAJ TOTAL SALES
16,590
ZALLAQ TOTAL SALES
36,610
ARAD & RIFFA TOTAL SALES
61,420
SITRA & ZALLAQ TOTAL SALES
51,860
AVERAGE DELIVERY CHARGES
29
AVERAGE TOTAL COST
3,512
HIGHEST DELIVERY CHARGES
50
LOWEST DELIVERY CHARGES
5


NUMBER OF CUSTOMERS
22
NUMBER OF TRANSACTIONS
24
AVAILABLE CUSTOMERS NAMES
22
BAR CHART - BRANCHES TOTAL SALES RANKING & DELIVERY % OF TOTAL SALES BY BRANCH
ARAD
5
ZALLAQ
4
RIFFA
3
AMWAJ
2
SITRA
1
TOTAL PROFIT
45,594
GROSS PROFIT MARGIN %
64.89%


SLICER BY BRANCH
AMWAJ
SITRA
ARAD
ZALLAQ
RIFFA
IS A ONE BARANCH IS SELECTED
FALSE
SLICER - DELIVERY CHARGES
5
15
30
48
8
18
38
50
10
23
40
13
25
45
ONE DELIVERY CHARGES IS SELECTED
MULTIPLE VALUES SELECTED
DETAILED TABLES – MONTH, TOTAL SALES & TOTAL COST
MONTH | TOTAL SALES | TOTAL COSTS
JANUARY | 17,820 | 8,910
FEBRUARY | 25,820 | 17,240
MARCH | 50,860 | 32,432
APRIL | 5,160 | 3,010
MAY | 3,150 | 2,415
JUNE | 13,170 | 9,963
JULY | 720 | 440
AUGUST | 610 | 384
SEPTEMBER | 9,900 | 7,788
NOVEMBER | 1,960 | 1,274
DECEMBER | 700 | 420
SLICER PER MONTH
JANUARY
APRIL
JULY
NOVEMBER
FEBRUARY
MAY
AUGUST
DECEMBER
MARCH
JUNE
SEPTEMBER

CREATING A DAX CALENDAR

There are many cases when you will need to create a data table within the Power BI desktop. This could be as simple as creating a master date table or more complex such as creating a monthly or weekly index number tied to a date. To create a data table there are two methods for creating a data table. Method one, create the table directly in the Power BI Desktop, or method two loads the date table from the data source.

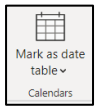
- Open Power BI Desktop, on the **Modeling** ribbon, click **New Table**.
- In the formula bar enter the following DAX expression:

```
DATES =
 GENERATE (
  CALENDAR ( DATE ( 2021, 1, 1 ), DATE ( 2021,12, 31 ) ),
  VAR CURRENTDAY = [DATE]
  VAR DAY = DAY( CURRENTDAY )
  VAR MONTH =  MONTH ( CURRENTDAY )
  VAR YEAR =  YEAR ( CURRENTDAY )
 RETURN   ROW (
  "DAY", DAY,
  "MONTH", MONTH,
  "YEAR", YEAR ))
```

DATE	DAY	MONTH	YEAR
01/MM/2021	1	1	2021
02/MM/2021	2	1	2021
03/MM/2021	3	1	2021
04/MM/2021	4	1	2021
05/MM/2021	5	1	2021

1. The **CALENDAR** DAX function generates a table with a list of dates from Jan 1 to Dec 31 of 2021.
2. We define variables (denoted by VAR) to capture details from the column named [Date] that is created by the CALENDAR function.
3. The Return function generates one row at a time. The row iterates through each [Date] item in the list which was created by the CALENDAR function. Variables are re-calculated for every row execution.

- Select the **DATE** Table
- Click Modeling and Choose Set the Mark as Date Table, Mark as Date Table.



EXTRA EXERCISE – HIGHLIGHT MINIMUM AND MAXIMUM SALES ON COLUMN CHART

Date File: SUPERSTORE DATA.xlsx

Colors: Use your own colors

Create a report with the following features:

- TOTAL SALES BY COUNTRY – Column Chart
    - Mark Highest country sales with the color: #88E209
    - Mark Lowest country sales with the color: #E73D18
    - All other columns with the color: #D6D6D6

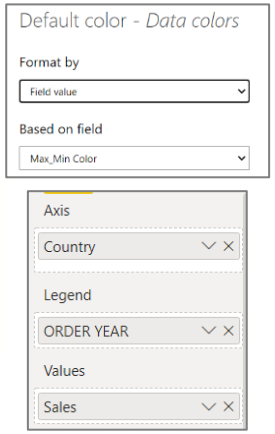
- TOTAL SALES CARD
- NUMBER OF SALES CARD
- COUNTRIES SALES RANKING OVER THE YEARS – RIBBON CHART
- SLICER by CATEGORY
- SLICER by SEGMENT

MAX & MIN MEASURES

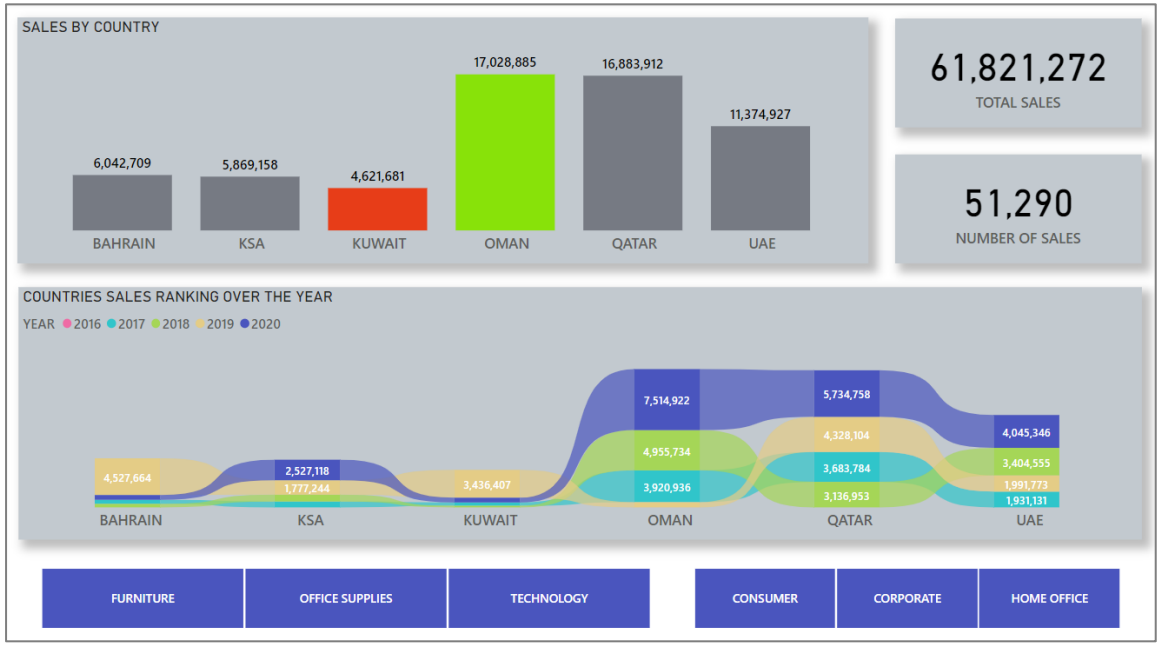
Max_Min Color =
VAR GetAllSales=ALLSELECTED(DATA[Country])
VAR GetMaxValue= MAXX(GetAllSales, CALCULATE(SUM(DATA[Sales])))

VAR GetMinValue= MINX(GetAllSales, CALCULATE(SUM(DATA[Sales])))
RETURN
IF(SUM(DATA[Sales])=GetMaxValue,"#88E209",
IF(SUM(DATA[Sales])=GetMinValue,"#E73D18","#D6D6D6"))

When creating a column chart, apply conditional Data Color using the MAX_MIN COLOR measure



- The Ribbon Chart Fields:
  - Axis = Country
  - Legend = Order Year
  - Values = Sales



FINAL REPORT

EXTRA EXERCISE – MY FINANCIAL REPORT

Date File: **MY FINANCE DATABASE.xlsx**

Colors: Use your Own Colors

- Import the data to Power BI
- Transform the data
- Unpivot the Data
- Insert YEAR Column
- Insert MONTH Column
- Insert Month Number Column
- Change the columns type as required. "as shown below in the table".

	TYPE	COMPONENT	DATE	VALUE	YEAR	MONTH NUMBER	MONTH
3	INCOME	SALARY	01/03/2018	30000	2018	3	MARCH
4	INCOME	SALARY	01/04/2018	30000	2018	4	APRIL
5	INCOME	SALARY	01/05/2018	30000	2018	5	MAY
6	INCOME	SALARY	01/06/2018	30000	2018	6	JUNE

- Close and Apply
- Change the VALUE Column to Decimals with 1000 separators
- The MONTH column should be sorted by the MONTH NUMBER column

- Create a _KEY MEASURES Table

MEASURES

- Insert the following Measures and place them under the _KEY MEASURES Table

  Total Saving = CALCULATE(SUM(FinData[Value]),FinData[Type]="Savings")

  Total Expense = CALCULATE(SUM(FinData[Value]),FinData[Type]="Expense")

  Total Income = CALCULATE(SUM(FinData[Value]),FinData[Type]="Income")

  Cumulative Net Worth = CALCULATE ([Total Saving], FILTER (ALL (FinData[Date]), FinData[Date] <= MAX ((FinData[Date]))))

  Expense % = DIVIDE([Total Expense],[Total Income])

  Income LM = CALCULATE([Total Income],DATEADD(FinData[Date],-1,MONTH)) *// (last Month)*

  Income Change MoM % = DIVIDE([Total Income],[Income LM])

  Savings % = DIVIDE([Total Saving],[Total Income])

  Savings target = 0.25

  Values = SUM(FinData[Value])

  Title = " My Finance Dashboard"

- Create a virtual table name: **TYPE** (TYPE SHOULD BE SORTED BY ORDER No)

TYPE	ORDER NO
INCOME	1
SAVINGS	2
EXPENSE	3

- Design the Report Below

Note:

- All Time Saving Cards should not be affected by the Slicers or any visual.
- Both chart should not affect any visual
- Both charts' values should be shown as Percentage of the Grand Total"

MAIN REPORT

TYPE	2018	2019	2020	2021
INCOME	**39,200**	**46,500**	**59,300**	**5,750**
MONEY MARKET	1,200	4,500	6,000	600
SALARY	38,000	42,000	53,300	5,150
SAVINGS	**10,450**	**10,900**	**9,900**	**1,300**
EMERGENCY FUND	2,000	1,500	900	300
FIXED DEPOSIT	1,800	1,300	1,100	250
MUTUAL FUNDS	6,200	7,700	8,600	800
PHYSICAL CASH	450	400	-700	-50
EXPENSE	**28,750**	**35,600**	**49,400**	**4,450**
ENTERTAINMENT	1,650	1,200	1,850	150
FOOD	7,400	9,100	11,200	900
HEALTH	1,200	2,100	3,700	300
HOUSE RENT	13,200	15,000	18,000	1,600
MONTHLY PAYEMENTS	4,000	7,700	12,400	1,200
SHOPPING	1,300	500	2,250	300
Total	**78,400**	**93,000**	**118,600**	**11,500**

NOTES: