



BMW Sales Dashboard



- Built By : Nouhaila LACHGAR
- Skills Acquired : **DAX - Data Transformation- Data Modeling - Data Visualisation**

Introduction

In this project, I developed an interactive dashboard that consolidates the key performance indicators (KPIs) reflecting BMW's sales performance across various markets. The dashboard provides a comprehensive view of critical metrics such as total sales volume, revenue trends, regional performance, and top-selling models, allowing for quick and informed decision-making.

To ensure the accuracy and reliability of the insights, I also performed thorough data modeling, clearly separating fact tables (such as sales transactions and revenue records) from dimension tables (such as time periods, geographic regions, and product details). This star-schema approach improved the efficiency of the data analysis process, minimized redundancy, and enhanced the performance of the dashboard.

By combining well-structured data models with insightful visualizations, the project delivers a powerful tool for tracking BMW's sales performance and identifying opportunities for growth.

Data Understanding

This step is crucial to help you understand data sources, columns' meaning and their content, and the general purpose behind the data itself. This will later help you understand what transformations to apply, and how to model the data for more coherent visuals.

The data provided was :

- **BMW_Sales_Data.csv** : This file contains data about models sold, quantities, prices, countries ...

Sample :

Date	Year	Model	Revenue	Quantity Sold	Region	Country	Channel
01/01/2019	2019	BMW X2	94654	2	Africa	Nigeria	Wholesale
01/01/2019	2019	BMW M4	111259	1	Africa	Kenya	Wholesale

- **Car_images.csv** : This file contains data about models and their image urls ...

Sample :

```
Model,img
BMW X2,https://i.i-sgcm.com/new_cars/cars/21799/21799_m.jpg
BMW M4,https://platform.cstatic-images.com/in/v2/stock_photos/aa68e468-a5a5-4269-a801-1aaf3a746bdf/ba7809b
```

- **Countries_with_flags.csv** : This file contains data about countries and their flags ...

Sample :

```
Country,Country code,Region,Flag
Andorra,ad,EMEA,https://i.ibb.co/jzB9Fnt/ad.png
United Arab Emirates,ae,EMEA,https://i.ibb.co/dKnDR1D/ae.png
Afghanistan,af,EMEA,https://i.ibb.co/Wvy58Bz/af.png
```

Business Requirements Analysis

Here we gather and analyse the business requirements to grasp what the company is looking for in this project. In this case the owners are expecting :

- **Revenue Trends** – to monitor sales growth over time and identify seasonal patterns.
- **Top-Selling Models** – to determine which BMW models generate the highest sales.
- **Sales Performance by Country** – to compare market performance across different regions.
- **Sales Channel Performance** – to evaluate the effectiveness of various distribution and sales channels.
- **Quantity Sold** – to track the total number of units sold over time.

Data Transformation

Initially, the main sales table that holds most of the data needed is in the following form (as a sample):

	📅 Date	📅 Year	📅 Model	📅 Revenue	📅 Quantity Sold	📅 Region	📅 Country	📅 Channel
1	01/01/2019		2019 BMW X2	94654		2 Africa	Nigeria	Wholesale
2	01/01/2019		2019 BMW M4	111259		1 Africa	Kenya	Wholesale
3	02/01/2019		2019 BMW 6 Series	94881		3 South America	Chile	Wholesale
4	04/01/2019		2019 BMW X2	35293		4 Asia	South Korea	Wholesale
5	04/01/2019		2019 BMW M2	76275		5 Asia	Japan	Wholesale
6	05/01/2019		2019 BMW iX3	74929		3 Asia	South Korea	Wholesale
7	06/01/2019		2019 BMW 8 Series	82563		4 South America	Colombia	Dealership
8	07/01/2019		2019 BMW 7 Series	71767		3 South America	Chile	Wholesale
9	07/01/2019		2019 BMW iX3	67202		4 Africa	Morocco	Wholesale
10	07/01/2019		2019 BMW i4	82195		5 Asia	Japan	Wholesale
11	08/01/2019		2019 BMW X4	106309		3 Europe	Italy	Wholesale
12	08/01/2019		2019 BMW M3	35983		4 Europe	Spain	Wholesale
13	08/01/2019		2019 BMW X6	74863		1 South America	Peru	Dealership
14	09/01/2019		2019 BMW 5 Series	59157		2 North America	Mexico	Dealership
15	09/01/2019		2019 BMW X6	59493		4 North America	United States	Wholesale
16	10/01/2019		2019 BMW M5	89019		4 Europe	Italy	Dealership
17	10/01/2019		2019 BMW 8 Series	113748		4 North America	Mexico	Wholesale
18	10/01/2019		2019 BMW 8 Series	68568		3 North America	Canada	Wholesale
19	11/01/2019		2019 BMW M4	118264		2 Europe	France	Wholesale

In fact it is so beneficial, yet it has some dimensions included, so we will need to separate them for more accuracy, so at first I duplicated the table to create other dimension tables (one for model, the other for channel and the last one for countries). After copying the table I kept only the dimensions column needed, then I kept only unique values while removing duplicates to get unique categories of each dimesion. Then I added an index column for a primary key :

Model_ID	Model
1	BMW X2
2	BMW M4
3	BMW 6 Series
4	BMW M2
5	BMW iX3
6	BMW 8 Series
7	BMW 7 Series
8	BMW i4

But now this table still needs the image urls to be complete, that is why I merged queries between both the new table and table from car_images.csv :

Merge

Select a table and matching columns to create a merged table.

Dim_Model

Model_ID	Model
1	BMW X2
2	BMW M4
3	BMW 6 Series
4	BMW M2
5	BMW iX3

Car Images

Model	img
BMW X2	https://i.s-gcm.com/new_cars/cars/21799/21799_m.jpg
BMW M4	https://platform.cstatic-images.com/in/v2/stock_phot...
BMW 6 Series	https://www.bmw.com.sg/content/dam/bmw/commo...
BMW M2	https://cache.bmwusa.com/cosy.arox?po=walkaroun...
BMW iX3	https://www.vertumotors.com/new/vertu/car/bmw/ix...

Join Kind
Left Outer (all from first, matching from second)

☐ Use fuzzy matching to perform the merge

Fuzzy matching options

✓ The selection matches 26 of 26 rows from the first table.

OK Cancel

Here is the result to this step :

123	Model_ID	Model	Car Images
	1	BMW X2	Table
	2	BMW M4	Table
	3	BMW 6 Series	Table
	4	BMW M2	Table
	5	BMW iX3	Table
	6	BMW 8 Series	Table
	7	BMW 7 Series	Table

Now I only need to keep the needed column (img url) :

Search Columns to Expand

☒ Expand ☐ Aggregate

☒ (Select All Columns)

☐ Model

☒ img

☒ Use original column name as prefix

OK Cancel

Applying the same steps to the countries and the channel dimensions, I have got these results :

Channel_ID ▾	Channel ▾
1	Wholesale
2	Dealership
3	Online

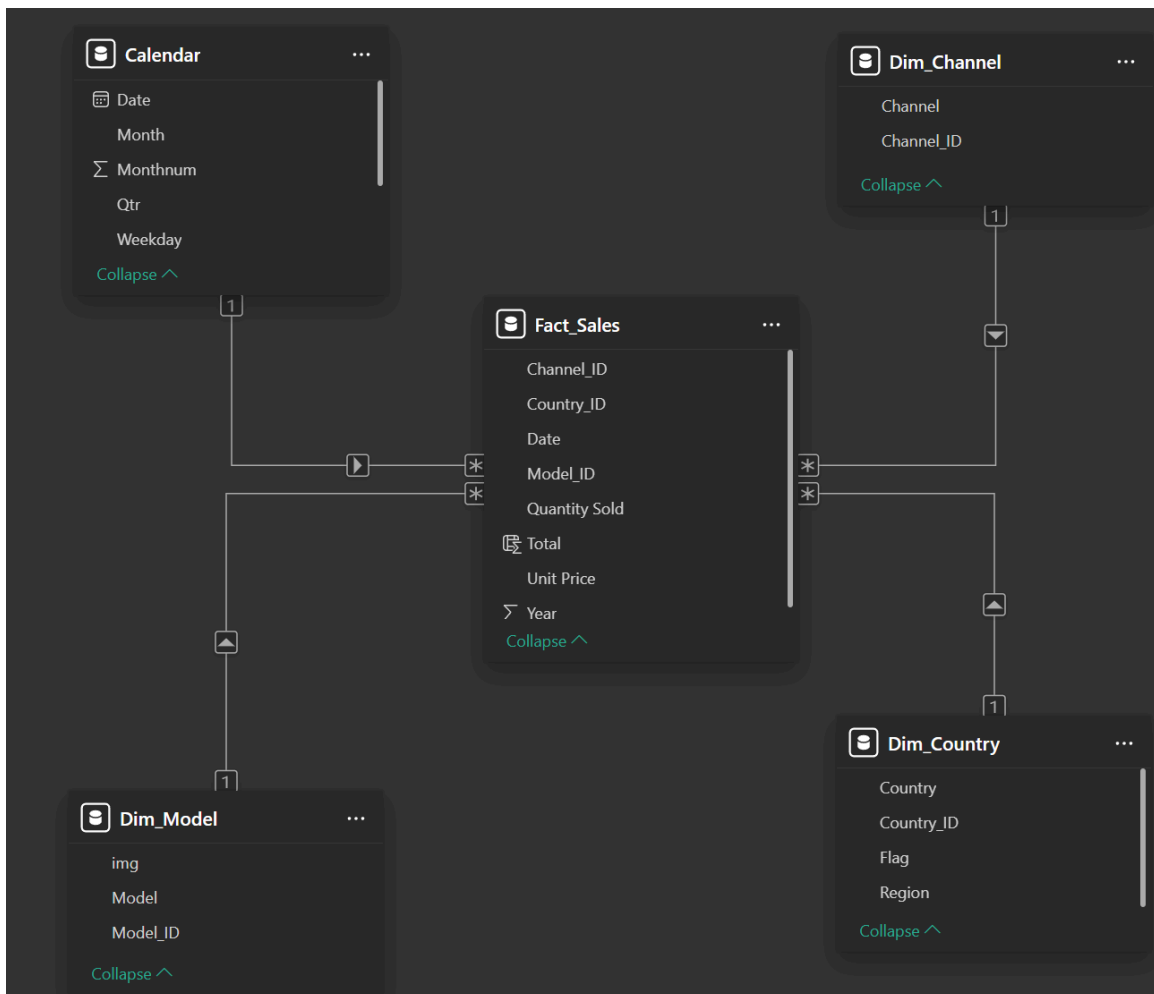
Country_ID ▾	Country ▾	Region ▾	Flag ▾
15	Argentina	South America	https://i.ibb.co/7br3tBg/ar.png
17	Brazil	South America	https://i.ibb.co/SR5Md2g/br.png
13	Canada	North America	https://i.ibb.co/V20HTNv/ca.png
3	Chile	South America	https://i.ibb.co/BCdpr3v/cl.png
16	China	Asia	https://i.ibb.co/rtz1qdl/cn.png
6	Colombia	South America	https://i.ibb.co/1TMcQyD/co.png
20	Germany	Europe	https://i.ibb.co/Gd8sDSN/de.png
19	Egypt	Africa	https://i.ibb.co/qg3Wn1Z/eg.png

Data Modeling

Now that I have extracted all the dimensions needed, I will need to add one more important dimensions, a date table to excel modeling and here the DAX syntax for the table I used :

```
Calendar =  
ADDCOLUMNS(  
    CALENDARAUTO(),  
    "Year", YEAR([Date]),  
    "Month", FORMAT ([Date], "mmm"),  
    "Monthnum", MONTH([Date]),  
    "Weekday", FORMAT ([Date], "ddd"),  
    "Weeknum", WEEKDAY ([Date]),  
    "Qtr", "Q" & FORMAT([Date], "Q"),  
    "WeekType", IF (WEEKDAY ([Date])=1 || WEEKDAY ([Date]) = 7, "weekend", "Weekday"))
```

And here is the final result for the data modeling work :



Data Visualization

Finally we can see all the work done comes together into one coherent dashboard that we can exploit based on the needs.

To calculate the revenue, I created using DAX the following measure :

```
Revenue = sum( Fact_Sales[Total])
```

And for the sparklines on the countries table for the revenue I used this syntax I got from KerryKoloso.com:

```
Revenue Sparkline =
// Line and area colours - use %23 instead of # for Firefox compatibility (Measure Derived
from Eldersveld Modified by Kolosko)

// "Date" field used in this example along the X axis
VAR XMinDate = MIN('Calendar'[Monthnum])
VAR XMaxDate = MAX('Calendar'[Monthnum])

// Obtain overall min and overall max measure values when evaluated for each date
VAR YMinValue = MINX(Values('Calendar'[Monthnum]),CALCULATE([Revenue]))
VAR YMaxValue = MAXX(Values('Calendar'[Monthnum]),CALCULATE([Revenue]))

// Build table of X & Y coordinates and fit to 50 x 150 viewBox
VAR SparklineTable = ADDCOLUMNS(
    SUMMARIZE('Calendar','Calendar'[Monthnum]),
    "X",INT(150 * DIVIDE('Calendar'[Monthnum] - XMinDate, XMaxDate - XMinDate)),
    "Y",INT(50 * DIVIDE([Revenue] - YMinValue,YMaxValue - YMinValue))

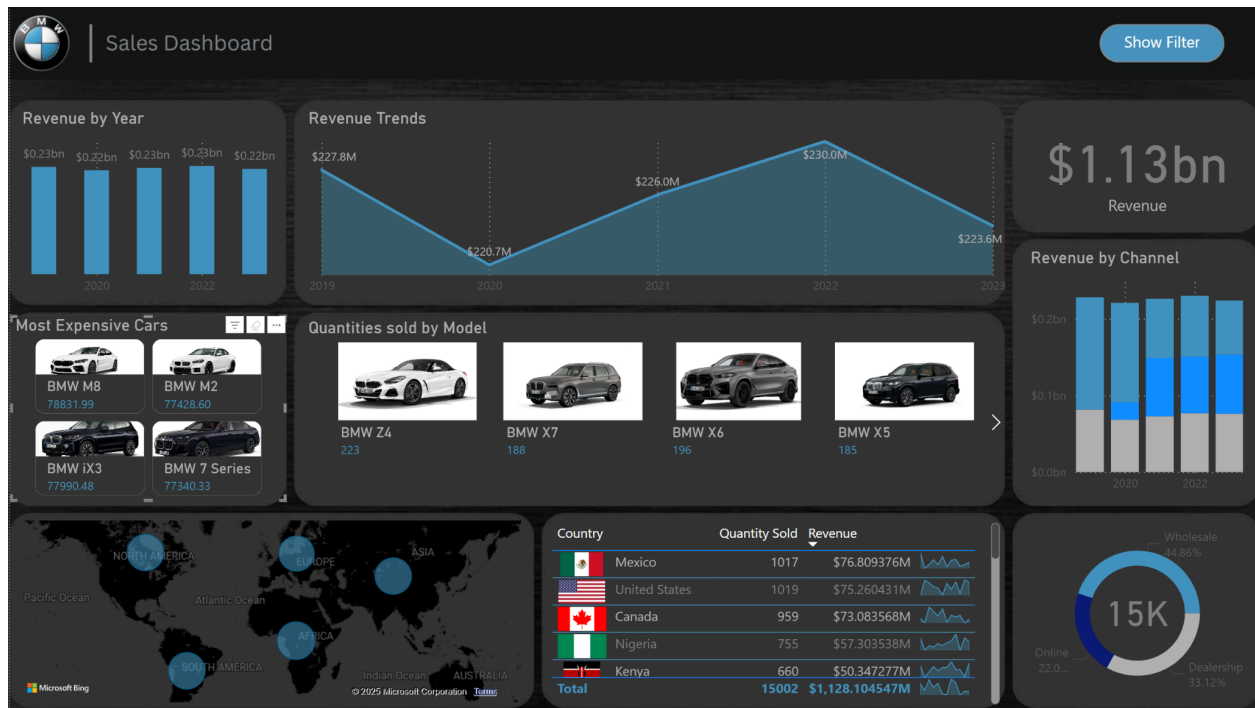
// Concatenate X & Y coordinates to build the sparkline
VAR Lines = CONCATENATEX(SparklineTable,[X] & "," & 50-[Y]," ", 'Calendar'[Monthnum])

// Add to SVG, and verify Data Category is set to Image URL for this measure
VAR SVGImageURL =
    "data:image/svg+xml;utf8," &
    "<svg xmlns='http://www.w3.org/2000/svg' x='0px' y='0px' viewBox='0 0 150 50'>" &
    "<polyline fill='#4595be' fill-opacity='0.3' stroke='#4595be' " &
    "stroke-width='3' points=' 0 50 " & Lines &
    " 150 150 Z ' /></svg>"
RETURN SVGImageURL
```


I also applied a filter the most expensive sold cars (avg unit price) :

Model
 top 4 by Average o...
 Filter type ⓘ
 Top N
 Show items
 Top 4
 By value
 Average of Unit Price
 Apply filter

And here is the final result of the BMW Sales Dashboard



I also added a filter menu that has some details to ease the navigation more :

