BIG DATA AND BUSINESS INTELLIGENCE MODULE

TAKINRA SUPERSTORE SALES ANALYSIS

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Executive Summary

With the current growth in the amount available data globally and the massive benefits that have been recorded by businesses that have implemented business intelligence solutions. The use of business intelligence solutions has helped organisations to provide insights from their business data and has equally helped business managers make better business decisions. The use of business intelligence solution has led to increased efficiency in business process, increased customer satisfaction and increased profitability for many organisations.

Takinra has been experiencing a slow growth in its operations, especially in terms of revenue and customer base, the management has decided to use technology to proffer solution to some of these problems. The business intelligence solution helps Takinra to analyse and measure its performance and discover insight from its data. It provides the key performance indicators that measures the critical areas of the business. The solution also helps to analyse the performance of the store across the different business segments, category offerings and products, it will analyse the key variables that influences the performance of the store as well as make recommendations on how to increase the performance of the store.

Findings and Conclusions: Based on the business requirements and after a detailed analysis of Takinra's data, the following are the findings of the business intelligence solution review:

- Takinra has a sales turnover of 12.6million with a profit of 1.4million and has given out 7300 as discount. It has 1590 customers and has completed over 25000 orders.
- Consumer segment brings in the biggest revenue and this accounts for 52% of the total sales recorded, while corporate segment generates 30% followed by home office with 18%. The technology category generates 4.7m in sales, with furniture category earning 4.1million and 3.7million was recorded by office supplies.
- The East and Central are the top performing regions, while the United States is the top performing country generating over 2.3 million in revenue.
- Takinra has earned over 12.6million as revenue and incurred a cost of 11.18 million, in essence, the store has a 13% profit margin. The store has also completed 25000 orders and sold over 10000 products over a period of 4 years.
- Apple, Cisco, and Motorola smartphones are the most performing products offered by the store, while Eureka disposable bags, and Avery 5 are the least performing products.

Recommendations

- Cost Reduction: Cost optimization should be considered to reduce the operational expense of the store. This will increase the profitability of the store
- Marketing Campaigns: More campaigns should be targeted at home office customers to increase the store's share of the home office market share. Currently the segment only accounts for 18% of the total revenue.

- Pricing: It was observed that the current pricing model offers some products at a lower rate than the actual cost of goods and the implication of this is that the store is incurring loss on each of those products. A price review or audit of all the store's product offering is recommended to block all the areas causing income leakage.
- Discounts: While offering discount is a good strategy to drive sales, however, a review of discount offered on products is recommended. A sizeable amount for the store is being eroded by the discount offered, the data also showed that the store is offering discounts on products that are currently selling lower than the cost of product. This further increase the losses recorded by the store.
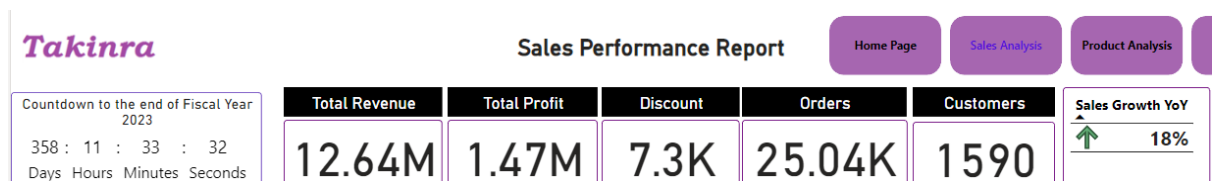
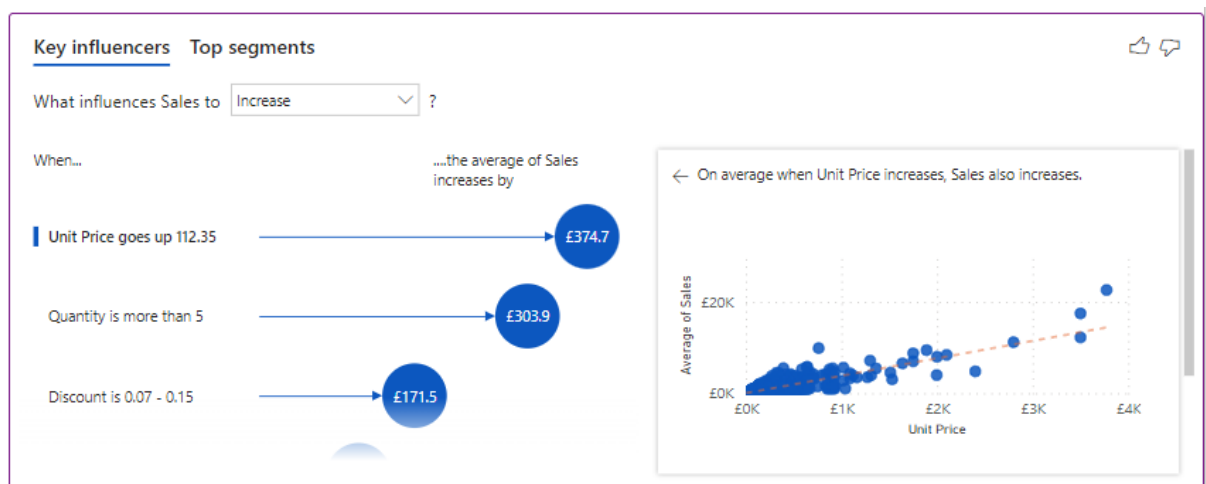Figure 1: Key Performance Indicator

Figure 2: Sales Key Influencers

Introduction

Advancement in technology has changed the dynamics of business worldwide, business operation has moves from the traditional mode of conducting business to using digital processes and systems to maximise their business opportunities and increase customer satisfaction. (Sana, Rao and Wahleej,2022). The increased use of digital systems by individuals and organisations has also led to a massive growth in the amount of available data, according to the data released by Statista (2022), the total amount of data created, stored and consumed globally was about 64.2 zettabyte as of 2022 and this is projected to increase to about 180 zettabytes by 2025.

Business intelligence (BI) is a data-driven tool that incorporate data gathering, data storage, and knowledge management with analysis to provide insight that helps in making better business decision. (Negash and Gray, 2008).

Takinra is a multinational retail store that operates in many countries, the store has physical presence in over 10 countries in Europe and operates via electronic platforms in the other countries, it has a running database that stores details of transactions and their daily operations. The store started experiencing a decline in sales before the Covid-19 pandemic, this grew worse during the pandemic, the. Recently, a new management was appointed to take over the operations of the store. The management have requested that the technology team to develop a business intelligence solution that can provide the needed insight required to make decisions

Dataset Analysis
Data Source: The Dataset was downloaded from Kaggle.(Link here), it has 51292 rows and 24 columns. The table below provides a brief description of the dataset used in this project.

S/N	Column name	Data type	Description
1	Row ID	Whole Number	This is used to uniquely identify each row in the data
2	Order ID	Text	This is a unique ID assigned to every order successfully completed in the store. The data type is Text, this will allow the field to accept alphabets and numbers
3	Order Date	Date	It represents the date the order was made
4	Ship Date	Date	the date that the order is shipped from the store to the customer
5	Ship Mode	Text	This indicates when order must be delivered to customer
6	Customer ID	Text	This is a unique means of identification assigned to each Customer registered on the platform
7	Customer Name	Text	The name associated to each customer
8	Segment	Text	This contains the different categories of customers based on some business defined characteristics
9	City	Text	The name of each settlement where customers are placing orders from
10	State	Text	It contains information about States where orders are made from
11	Country	Text	List of countries where customers are placing orders from
12	Postal Code		
13	Market	Text	Business-defined segmentation
14	Region	Text	Business-defined segmentation
15	Product ID	Text	This represents a unique number assigned to each product
16	Category	Text	Broad classification of the store's major offerings

17	Sub-Category	Text	A drilled-down classification of the store's major categories
18	Product Name	Text	Name of product available at the store
19	Sales	Decimal Number	Revenue earned from a product
20	Quantity	Whole Number	The number of items sold
21	Discount	Decimal Number	The represent the reduction given from the regular price of product
22	Profit	Decimal Number	This is the income earned after deduction the operational cost of product
23	Shipping Cost	Decimal Number	Cost of moving the product from store to the customer's address
24	Order Priority	Text	This indicates the level at which the order is to be processed

Table 1: Data description

Figure 3: Screenshot of raw dataset

BI Business Requirements

The management of Takinra has tasked the technology team to develop a business intelligence solution that can provide insight that can aid in the decision-making process of the store as well as discover patterns in our customers purchase behaviour. The business intelligence solution will track the store's sales performance, profitability, order and customer growth performance. The solution will provide a 360-degree view of the overall sales performance. The solution is designed for senior managers to track KPIs, gauge results and set performance target for the store, the solution provides three dashboards namely.

1. Sales Analysis Report
2. Product Analysis Report

3. Forecast and Analytics

The Business intelligence solution will answer the following questions to fulfil the requirement of the store's management.

Sales Analysis Report: This is expected to provide a high-level view of the performance of the store. The questions below would be solved under the sales analysis report

- How much of revenue and profit is the store generating?
- How many orders and customers does the store have?
- What is the yearly sales growth rate?
- What is Customer segmentation performance and sales pattern over the past 4 years?
- Which regions and countries are contributing the most to the sales growth?

Product Analysis Report: This is expected to provide a more granular details about the product sales performance. The following business questions would be considered in the product analysis reports.

- What is the total revenue against the total cost and how many products does the store sell?
- What are the Top performing products?
- What are the least performing products?
- What is the correlation between price and quantity of items sold?

Forecast and Analytics

- What are the key influencers that affects the sales?
- How many customers do we have in each country?
- What is the projected forecast for the next one year?

Analysis and Evaluation

Question 1: How much of revenue and profit is the store generating?
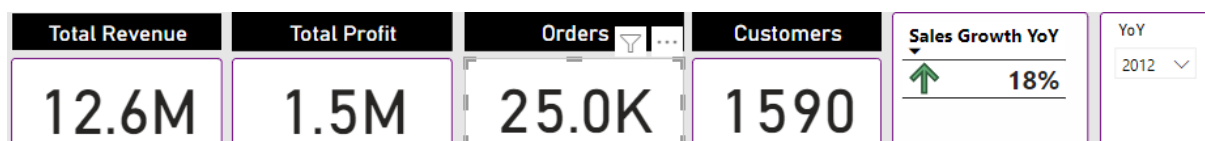

Figure 4: Sales KPI

The following Key performance indicators (KPIs) were developed to track and gauge the performance of the store. The data type is numerical, and they were calculated using measures and displayed as cards to provide summarised data about the store

Total Revenue: This is the total amount generated by the store from the sale of good. In the years under review, the store has generated about 12.6 million from sales.

Total Profit: This represents the company's revenue minus the cost of goods and services. The store has earned 1.5million in profits within the 4 years of the analysis.

Question 2: How many orders and customers does the store have?

The store currently has 1590 registered customers and has also completed the sales and processing of 25,000 orders successfully. Visual cards were used to display and track the summarised information of a single numeric data. It provides the managers with the precise summarised position of the store.

Question 3: What is the growth rate of the store?

Sales Growth rate: This measures the store's ability to earn income by sales over a specific period. The computation was done to compare the current year's sales performance of the store against the previous year. This will help managers measure performance target and policy evaluation.

To display and track the summarised information of a single numeric value the use of card has been used as it provides the managers with the precise summarised position of the store.

Question 4: What is Customer segmentation performance and sales pattern over the past 4 years?
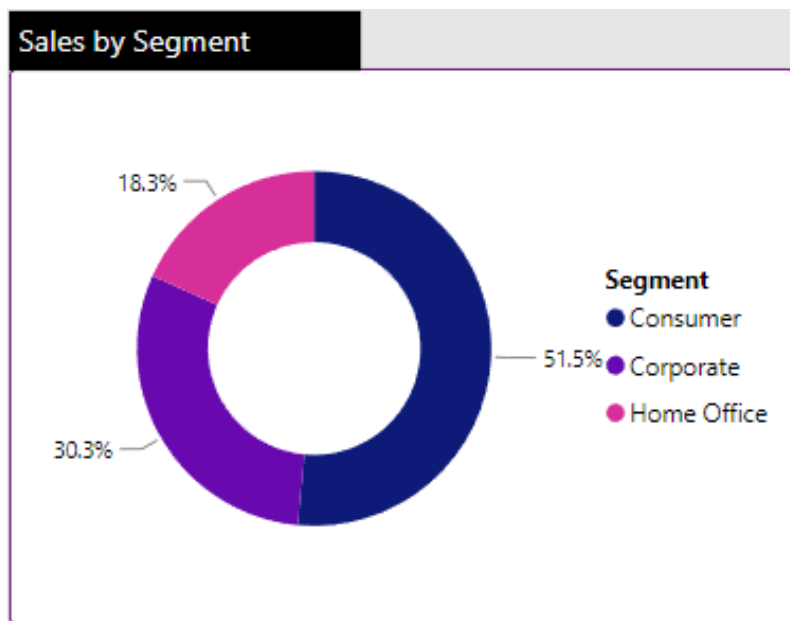

Figure 5: Business Segments

The current business model of the store has its operations divided into 3 main segments, namely consumer, corporate and home office. The chart represents the size of sales generated from each of the 3 segments. The consumer segments accounts for 51.5% of the total sales made by the store, followed by corporate segment with 30.3%, home office account for 18.3% of the total sales recorded by the store. A donut chart was selected to show the proportion

of the categorical data(segment) with the size of each piece denoting the proportion of each segment
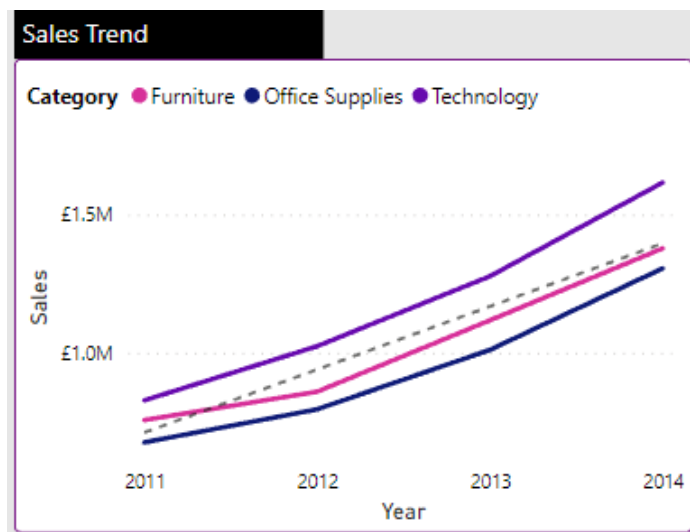
Sales Trend

Figure 6: Sales Trend

In the past four years, the three categories of goods sold by the store have been experiencing increase in the amount of revenue made by the store. In 2013, technology category experienced a slightly more positive increase in the revenue growth rate compared with furniture and office supply that have been growing at a steady rate. A line graph visual was used to represent this time-series data in order to show trends and changes in the sales pattern of the different categories over the past four years.

Question 5: Which regions and countries are contributing the most to the sales growth?
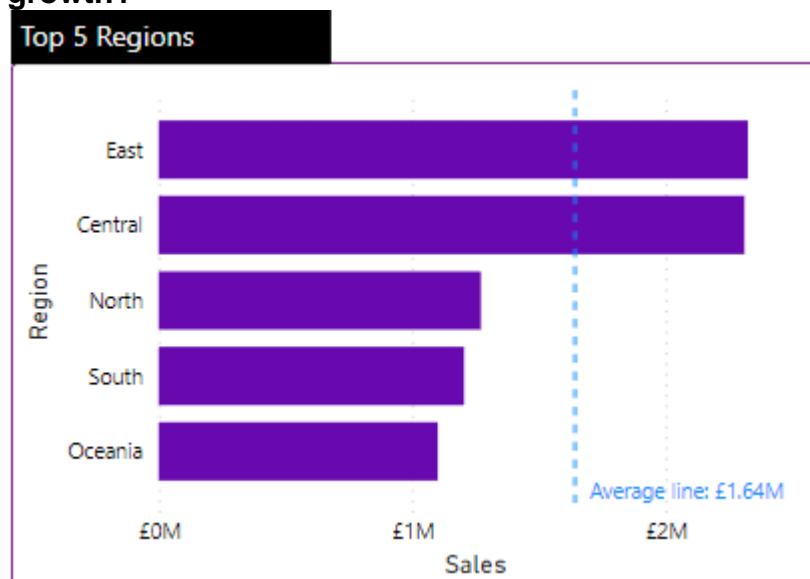
Figure 7: Top performing regions

The East and Central regions generate the highest sales for the store with over 2.3million each over four years. It also had sold over 30000 products each over the period under review. The North region has earned the store over 1.27 million in sales with about 18000 products sold, although the South region has sold over a thousand product more than the North region, it falls behind the North in terms of sales amount with about 1.2 million in sales, while the Oceania has generated about 1.1million and sold about 12,000 products
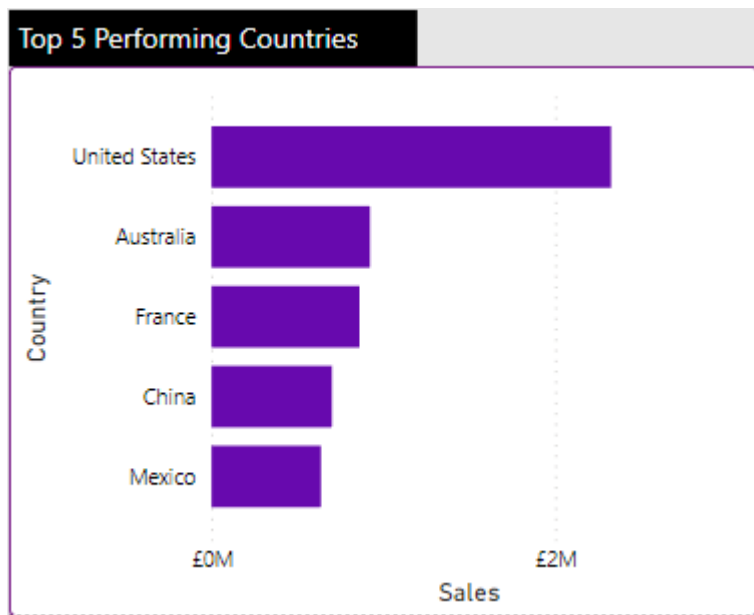
Figure 8: Top Performing countries

Comparing the sales performance of the store based on the country where orders were made from, orders from United States have generated over 2.3 million in total sales as is the most performing country, this is followed by Australia with almost one million in sales. France, China and Mexico are also listed in the Top 5 countries. However, none has generated over 1millon in sales over the years.

Bar chart is used to display and compare categorical data. The use bars of different height help the audience to easily compare the performance of the regions and countries.

Figure 9: Top performing categories

Product Analysis
The product analysis dashboard provides a granular detail of the store, this analysis focusses on the performance of the products offered by the store. The

Question 6: What is the total revenue against the total cost and how many products does the store sell?
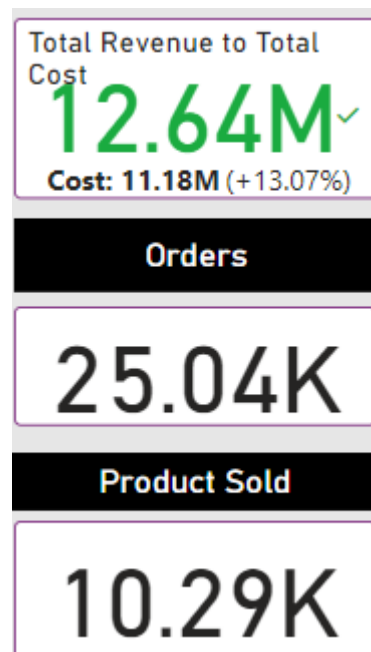

Figure 10: Product Analysis KPI

A card visual was implemented to compare the ratio of revenue earned against the cost spent. The store earned 12.6 million and recorded over 11.2 million as cost, this showed a profit margin of 13% across all segments.

The store has completed over 25,000 orders and has sold over 10000 unique products.

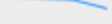**Question 7: What are the Top performing products?**

Top 5 Products

Product Name	Sub-Category	Sales(£)	Profit(£)	Profit Trend
Apple Smart Phone, Full Size	Phones	86,935.78	5,921.58	
Cisco Smart Phone, Full Size	Phones	76,441.53	17,238.52	
Motorola Smart Phone, Full Size	Phones	73,156.30	17,027.11	
Nokia Smart Phone, Full Size	Phones	71,904.56	9,938.20	
Canon imageCLASS 2200 Advanced Copier	Copiers	61,599.82	25,199.93	

Figure 11: Top Performing Products

The phone sub-category is the most performing with 4 of its products leading as the best earners in terms of revenue. The profit trends for Apple smart phone, Cisco smart phone and Motorola have been on the increase since 2013, while the profit trend for Nokia smart phone has constantly been on the decrease since 2011. Canon imageclass copier that was added to the inventory in 2013 is the 5th most performing product.

Question 8: What are the least performing products?

Top 5 Least Performing Products

Product Name	Sub-Category	Sales(£)	Profit(£)	Discount(£)
Eureka Disposable Bags for Sanitaire Vibra Groomer I Upright Vac	Appliances	1.62	-4.47	0.80
Avery 5	Labels	5.76	2.82	0.00
Grip Seal Envelopes	Envelopes	7.07	2.39	0.20
Avery Hi-Liter Pen Style Six-Color Fluorescent Set	Art	7.70	3.16	0.00
Xerox 1989	Paper	7.97	2.69	0.20

Figure 12: Least Performing Products

Eureka disposable bag is the least performing product and each item sold gives the store a loss of 4.47 pounds. The product also currently gives a discount of 80pence, this further increases the poor performance of this product. Avery 5, Grip seal envelops, Avery hi-liter pen and Xerox 1989 are

also not performing well in terms of sales and the analysis shows that some of these products have discounts offered on them.
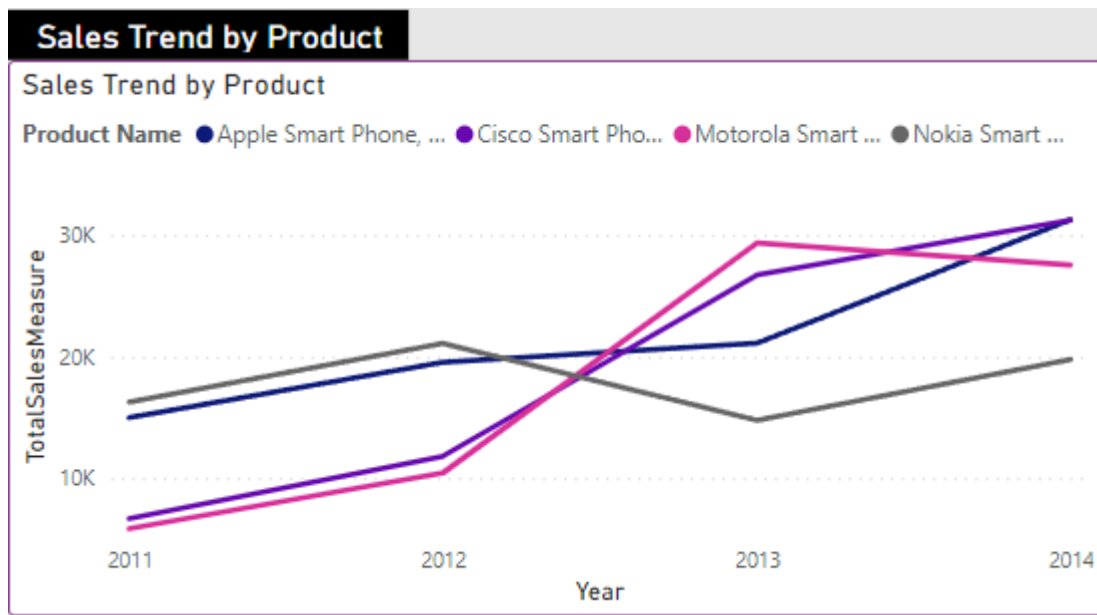

Figure 13: Product Sales Trend

The chart shows the sales trend over four years for the Top 4 performing products

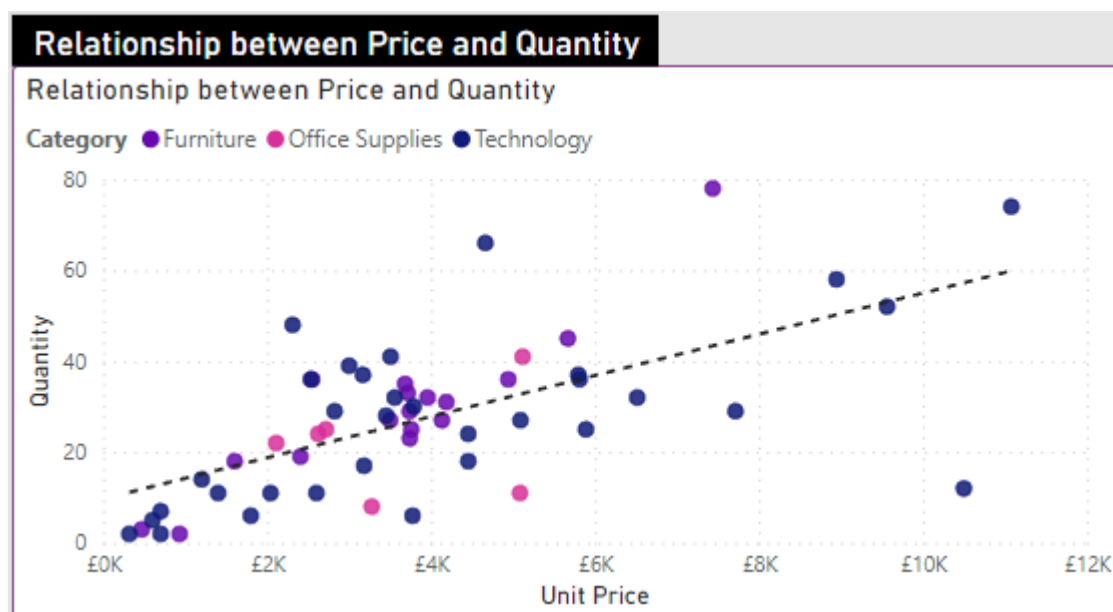**Question 8: What is the correlation between price and quantity of items sold?**

Figure 14: Relationship between Price and Quantity

The analysis shows that the relationship between the cost of product and the number of products sold. It helps shows the spending pattern of the consumers using the store. The analysis shows that the store sells more products that are 4000 pounds and below. Some products under Technology, as the price of some products increases the quantity of sold also increases.

The scatter plot was used to show if there is any relationship between price and quantity.

Forecast and Analytics Report
Question 9: What is the projected forecast for the next one year?
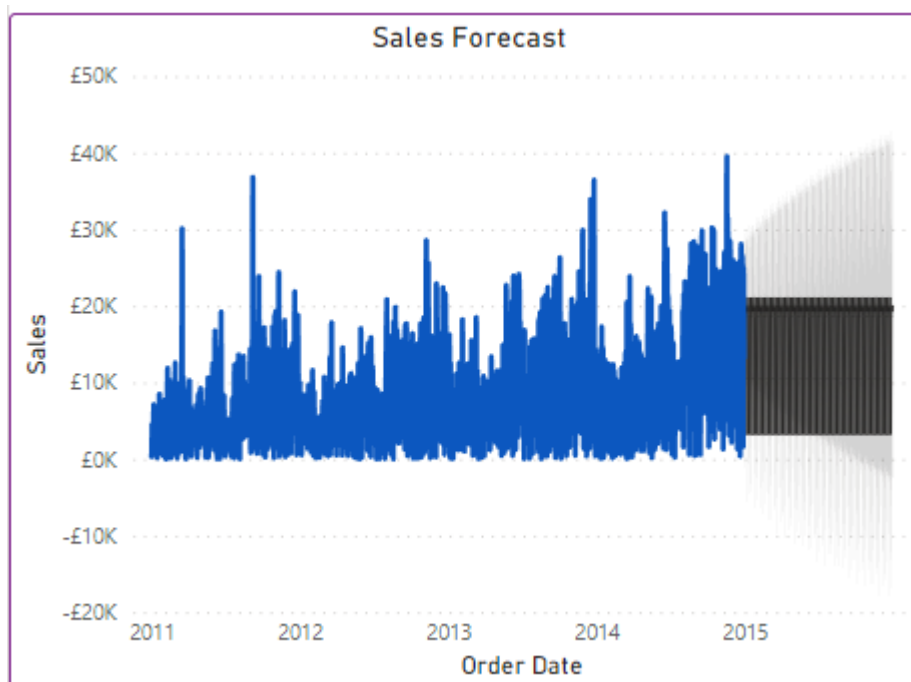
Figure 15: Sales Forecast

The sales forecast chart shows the sales trend over 4 years and computes the projected sales forecast for the store over 1 year.

Question 10: How many customers do we have in each country?
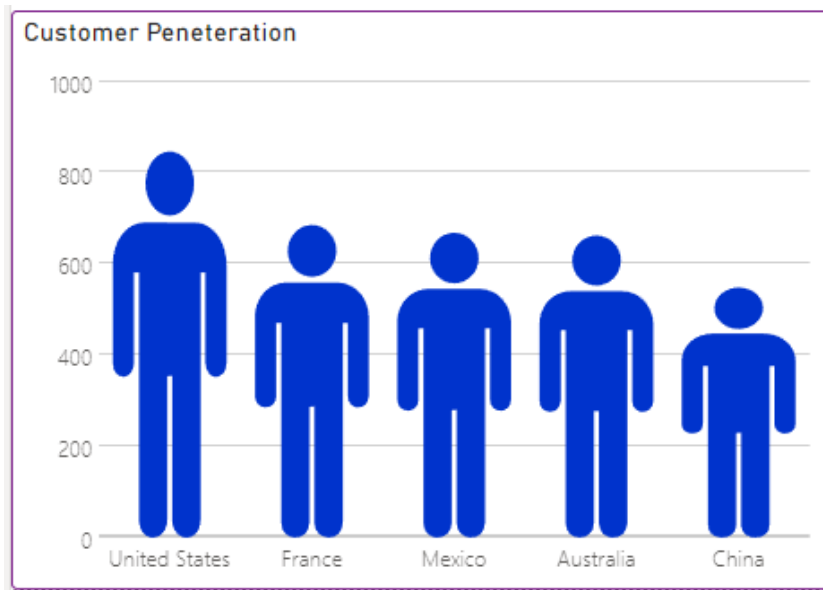
Figure 16: Customer Penetration

Customer Penetration

This represent the number of registered customers in each country where the store is currently running its operations. From the analysis, the store has 846 customers in United States.
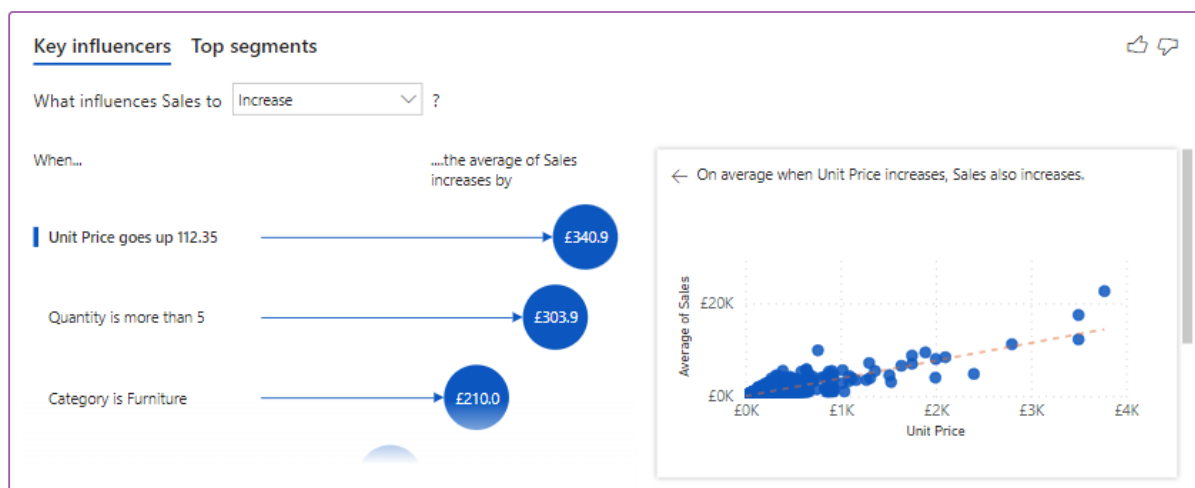
Question 11: What are the key influencers that affects the sales?

Figure 17: Sales Key Influencers

The key influencers visuals help find and establish factors that drives a metric. Sales is expected to increase when the unit price goes up, the key influencer algorithm is also projecting the store to have an average sale of 303 pounds

when more than 5 products are sold. It is also projecting an average sale of 171 pounds when discount is kept between 7 -15 pence.
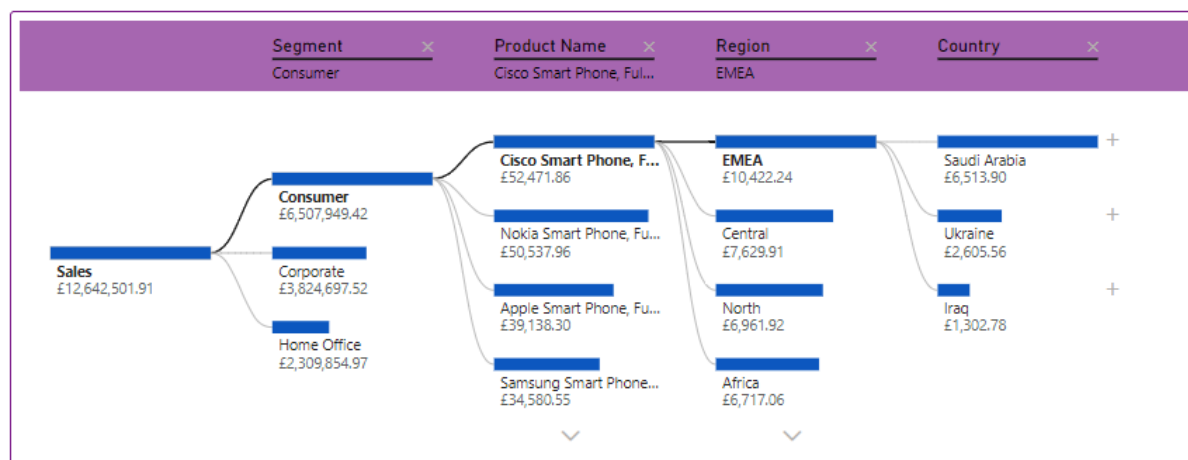
Figure 18: Decomposition Tree Analysis

The decomposition tree visual provides a root cause analysis and data exploration capability for the solution. It shows the breakdown of the store's performance across the three segments.

Conclusion and Recommendation

The BI solution provides a high-level overview of Takinra Store, it also provides insights about the performance of the products offerings. The solution also has AI-driven analytics charts that provides the projected sales forecast and key influencers that can help the store increase its revenue base.

In summary, the Consumer segment is the most performing segment, it generates about 6.5million pounds for the store while Technology category earned the store 4.7 million.

The East and central region are also the most performing regions based on the analysis. The store made a sale of 2.3million pounds from United States within the period under review.

Phones is the top selling sub-categories generating a turnover of over 1.7million pounds, while copiers and chairs are also performing well in terms of sales.

Apple smartphones, Cisco smartphones and Motorola smartphones are the most performing products.

Consumers also purchase more of the products that are less than 4000 pounds than the high-end products except for products under Technology category

Recommendations

- Discounts: While offering discount is a good strategy to drive sales, however, a review of discount offered on products is recommended. A sizeable amount for the store is being eroded by the discount offered,

the data also showed that the store is offering discounts on products that are currently selling lower than the cost of product. This further increase the losses recorded by the store.

- Pricing: A reassessment of the store's pricing model is being recommended to make the store more profitable. The current pricing model offers some product at a lower price than the actual cost of product. Sales discontinuation of products considered not viable should be considered to reduce the losses incurred by the store
- Cost reduction: Takinra can increase its revenue base by optimising some of its operation which can help reduce its operational expense.
- Marketing strategy: A more aggressive marketing campaigns should be planned to increase the customer base in the current countries of operation, the current customer base is relatively low and an increase in the numbers will positively increase the profitability of the store.

Personal Reflection

During the module, I have been able to learn new techniques used in dealing with data related issues that can affect the integrity of a business intelligence solution. I understand how deleting missing data in few columns can affect the final solution. It may be best to find ways of replacing the missing values rather than deleting the missing data.
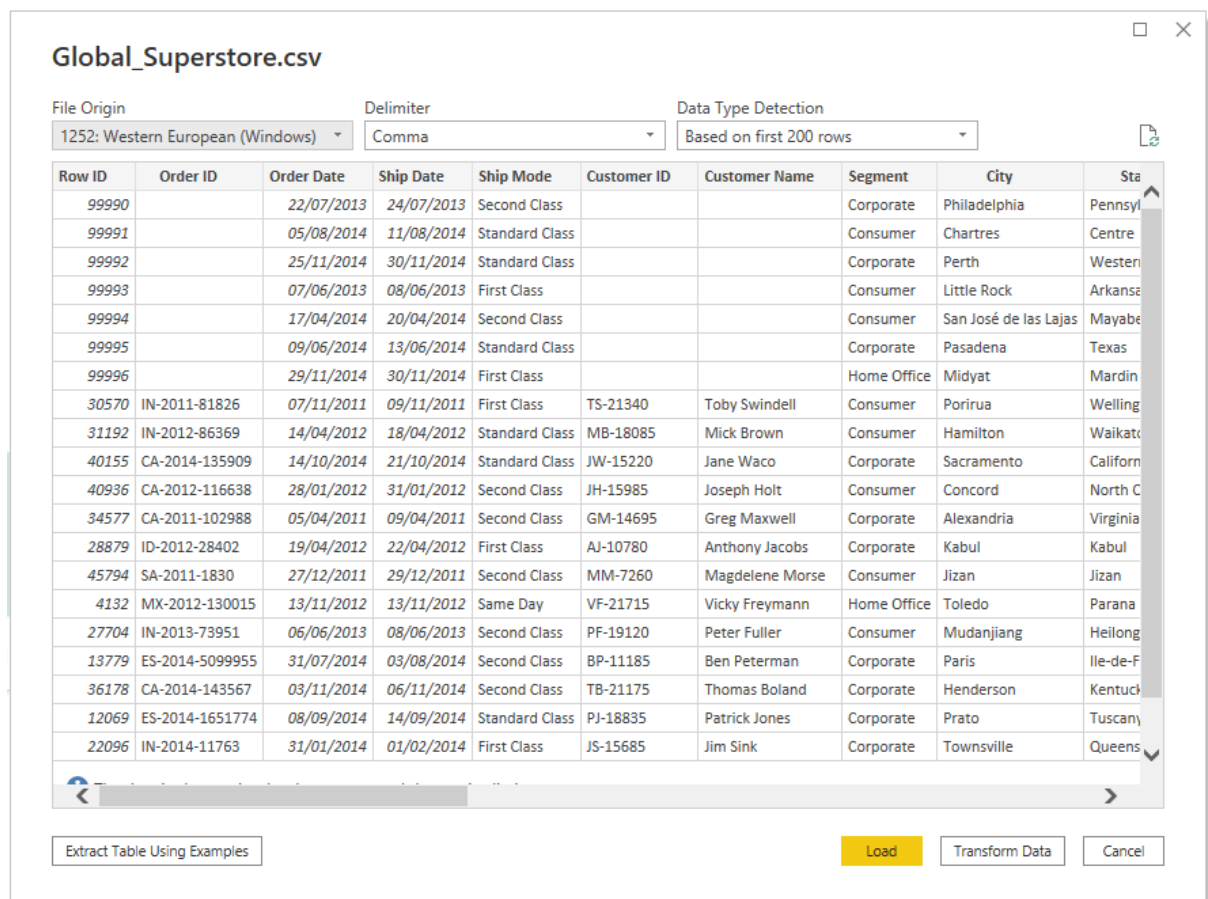
I have also learnt how to build data warehouse models that can perform efficiently and has high optimization.

Appendix: BI Design

Data Pre-Processing or Data Cleansing
Data cleansing is the process of identifying and resolving errors, duplicates, and unnecessary data from the dataset. The following activities were carried out as part of the data cleaning process

- Promoted First row as Header
- Removal of 7 rows with blank data (Customer ID, Customer Name and Order ID)
- Removal of 1 column (Postal code) due to the high number of missing values

Global_Superstore.csv

File Origin		Delimiter		Data Type Detection			
1252: Western European (Windows) ▾		Comma ▾		Based on first 200 rows ▾			

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	City	Sta
99990		22/07/2013	24/07/2013	Second Class			Corporate	Philadelphia	Pennsyl
99991		05/08/2014	11/08/2014	Standard Class			Consumer	Chartres	Centre
99992		25/11/2014	30/11/2014	Standard Class			Corporate	Perth	Western
99993		07/06/2013	08/06/2013	First Class			Consumer	Little Rock	Arkansa
99994		17/04/2014	20/04/2014	Second Class			Consumer	San José de las Lajas	Maybe
99995		09/06/2014	13/06/2014	Standard Class			Corporate	Pasadena	Texas
99996		29/11/2014	30/11/2014	First Class			Home Office	Midyat	Mardin
30570	IN-2011-81826	07/11/2011	09/11/2011	First Class	TS-21340	Toby Swindell	Consumer	Porirua	Welling
31192	IN-2012-86369	14/04/2012	18/04/2012	Standard Class	MB-18085	Mick Brown	Consumer	Hamilton	Waikato
40155	CA-2014-135909	14/10/2014	21/10/2014	Standard Class	JW-15220	Jane Waco	Corporate	Sacramento	Californ
40936	CA-2012-116638	28/01/2012	31/01/2012	Second Class	JH-15985	Joseph Holt	Consumer	Concord	North C
34577	CA-2011-102988	05/04/2011	09/04/2011	Second Class	GM-14695	Greg Maxwell	Corporate	Alexandria	Virginia
28879	ID-2012-28402	19/04/2012	22/04/2012	First Class	AJ-10780	Anthony Jacobs	Corporate	Kabul	Kabul
45794	SA-2011-1830	27/12/2011	29/12/2011	Second Class	MM-7260	Magdelene Morse	Consumer	Jizan	Jizan
4132	MX-2012-130015	13/11/2012	13/11/2012	Same Day	VF-21715	Vicky Freymann	Home Office	Toledo	Parana
27704	IN-2013-73951	06/06/2013	08/06/2013	Second Class	PF-19120	Peter Fuller	Consumer	Mudanjiang	Heilong
13779	ES-2014-5099955	31/07/2014	03/08/2014	Second Class	BP-11185	Ben Peterman	Corporate	Paris	Ile-de-F
36178	CA-2014-143567	03/11/2014	06/11/2014	Second Class	TB-21175	Thomas Boland	Corporate	Henderson	Kentuck
12069	ES-2014-1651774	08/09/2014	14/09/2014	Standard Class	PJ-18835	Patrick Jones	Corporate	Prato	Tuscany
22096	IN-2014-11763	31/01/2014	01/02/2014	First Class	JS-15685	Jim Sink	Corporate	Townsville	Queens

Extract Table Using Examples   Load   Transform Data   Cancel

Figure 19: Dataset Preview

Figure 20: Data in Power Query

Figure 21: Data after First row has been promoted as Header

Figure 22: Data after missing data in Order ID, Customer ID and Customer Name have been removed

Figure 23: Data with missing values in the Postal code column

Figure 24: Data after postal code column have been removed

BI Data Modelling via Star Schema - Facts and Dimensions.

Data modelling is the process of analysing and defining all the different data collected and produced by the store, as well as the relationships between the data. (Miscrosoft,2022).

The dataset was duplicated multiple times to create addition tables to be used in creating Fact and dimensions tables.

Fact tables are the core of data warehousing, they store the data to be analysed, it keeps the metrics and core details about the business process. It stores the quantitative metrics and houses the primary key used to reference the dimension tables (Myrianthous, 2022).

Dimension tables are slowly changing data, business information and processes are stored in dimension tables.

A snowflake data model was implemented for this project in manage the many-many relationships that might arise in the demographic data (city, state, country, market, and region). It was also selected to accommodate the anticipated growth in size of the demographic data as the store is currently in operation in many cities with plans for expansion into more cities.

The model helps in optimizing the data retrieval and analytics process, it also helps in improving data integrity.

The solution has a fact table and five dimension tables.

    Global_Fact to Product_Dim

    Global_Fact to Category_Dim

    Global_Fact to Customer_Dim

    Global_Fact to Country_Dim

    Country_Dim to Regiom_Dim
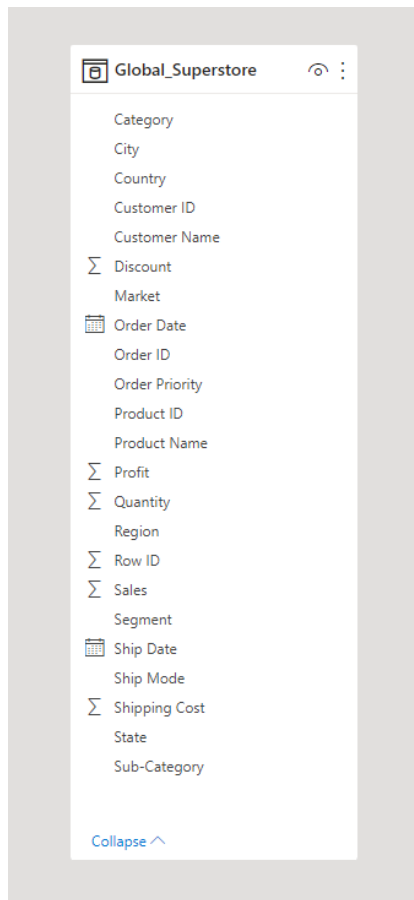
Figure 25: Model before creating Fact and Dimension Tables
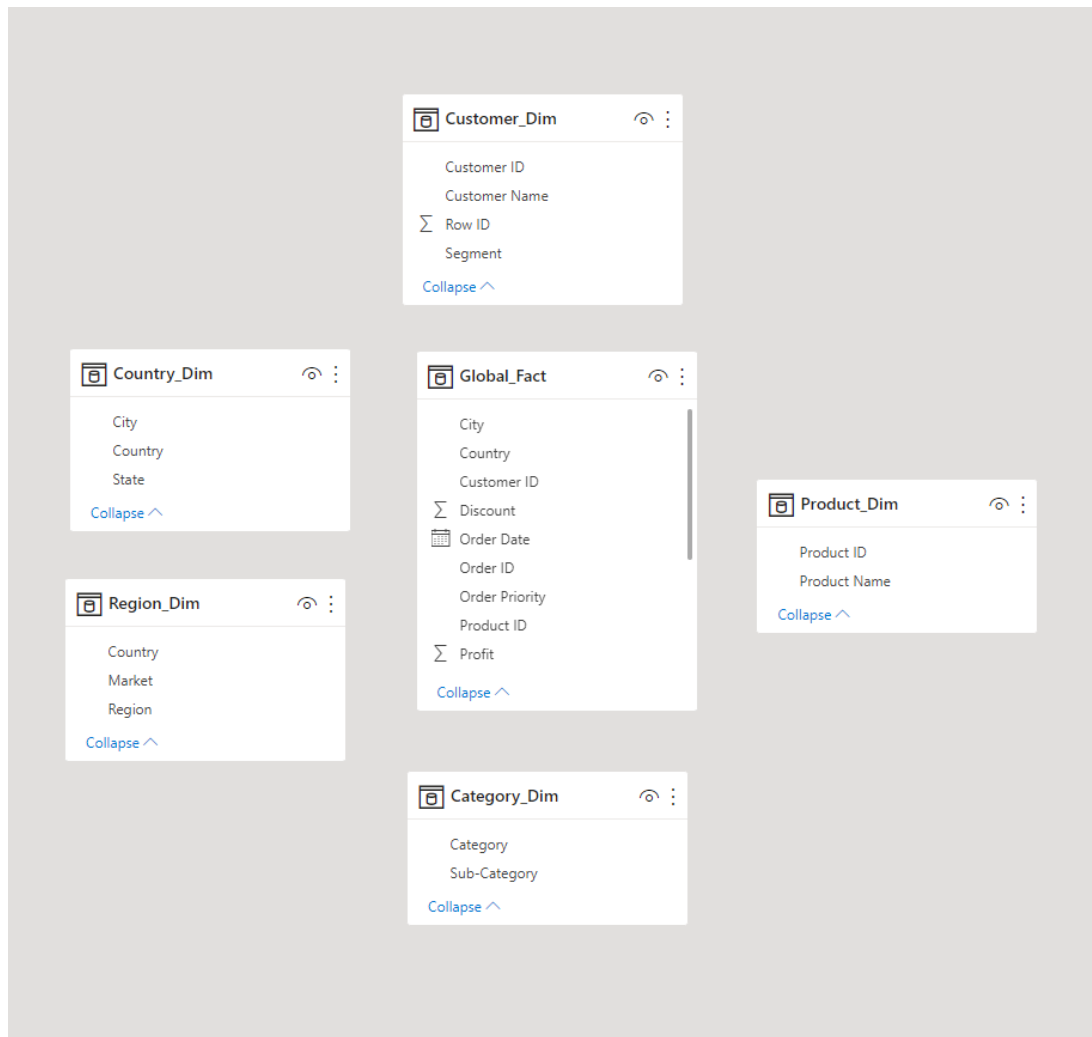
Figure 26: Model after creating fact and Dimensions with no relationships

Model Analysis

Global_Fact: This is the fact table and contains the metrics and numeric quantitative values of the store

Product_Dim: Contains details about the store's product offerings. The unique key is the product ID. The product ID was used to connect to the product ID in the fact table

Category_Dim: Contains details about the categories and sub-categories, the unique key is the sub-category. The unique key was used to connect to the fact table using the sub-category column on the fact table

Customer_Dim: Contains details about the store's customers and the unique key is the rowID. A one-to-one relationship was used to connect the dim table to the fact table using the ROWID column in both tables

Country_Dim: It houses details about the geographical location where customers are located. The unique key is the city. This table also act as bridge table for the Region_Dim dimension table, the country column act as the key

to the region_dim table.

Region_Dim: It stores details about the stores business regional segments. The country column is the unique key connecting to the Country_Dim table.
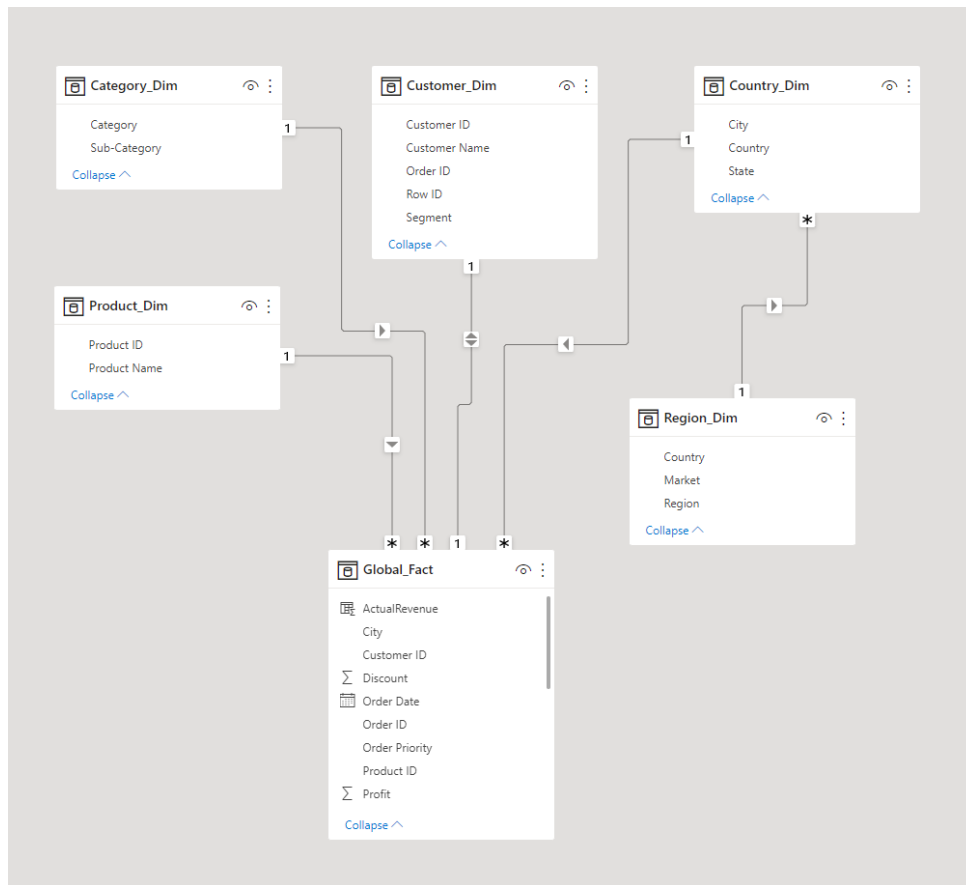
Figure 27: Snow-flake model after relationship has been established.

DAX and M Language

Data Analysis Expression is a formula language used to define custom calculations for calculated columns and measures.

Calculated Columns

These are columns added to an existing table, the DAX formula calculates values for each row in the column. The calculated columns created using DAX in this project are.

- Actual Revenue: This calculates the actual revenue earned by the store after deducting the discount given on each item from the Sales amount
    ActualRevenue = Global_Fact[Sales] - Global_Fact[Discount]

Figure 28: Calculated column showing the Actual Revenue

- Total Cost: This represents the sum of expenses spent by the store in producing the good to a specific level of output.
  TotalCost = Global_Fact[Sales] - Global_Fact[Profit]

- Unit Price: This computes the price of each product sold
  Unit Price = DIVIDE(Global_Fact[Sales],Global_Fact[Quantity])

Measure

This is a calculated field that computes its output as an aggregated value rather that providing the outputs of individual rows. (Jeevan,2022). It provides a summarisation of data; the result changes users interact with the report. Measures also enables dynamic and speedy data exploration.

TotalSalesMeasure = CALCULATE(SUM(Global_Fact[Sales]))

TotalRevenueMeasure = CALCULATE(sum(Global_Fact[ActualRevenue]))

TotalCostMeasure = CALCULATE(sum(Global_Fact[TotalCost]))

TotalProfitMeasure = CALCULATE(sum(Global_Fact[Profit]))

TotalDiscountMeasure = CALCULATE(sum(Global_Fact[Discount]))

DAX was also used in creating title header for some of the charts, the header created are listed below:
CustCountText = "Customers"
GrowthRateYoY = "Growth Rate YoY"
No_Of_Order = "Orders"
Product_Title = "Product Analysis Report"

ProductSold = "Product Sold"
Profittext = "Total Profit"
Revenue = "Total Revenue"
Sales_Title = "Sales Performance Report"
Top 5 Products = "Top 5 Products"
Top10SubCategory = "Top 10 Sub-Category"
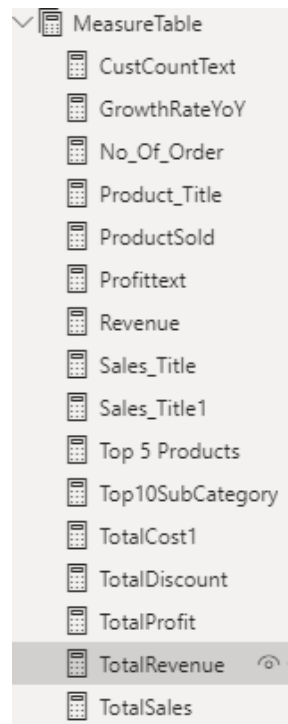
Figure 29: Measure Table

Yearly Growth Rate Computation
Creating a table for the Year-on-Year growth rate
To have a simplified visibility of the store's year-on-year growth rate, a table was created that summarises the performance of the store in a year. The query GroupbyYear uses a GROUPBY function which helpful in creating subgroups. In the solution, the groupby function aggregates the value of sales made each year. The SUMX(CURRENTGROUP()) function contains all the rows in the Sum operation in this case the year and TotalYearSales computed over an iteration of the Sales column.

Year	TotalYearSales	Sales Growth YoY
2011	2259450.90	0%
2013	3405746.45	27%
2012	2677438.69	18%
2014	4299865.87	26%

Figure 30: Table showing the Year-on-Year Growth rate

GroupbyYear = GROUPBY(Global_Fact,Global_Fact[Order Date].[Year],"TotalYearSales",SUMX(CURRENTGROUP(),Global_Fact[Sales]))

Calculating the growth rate for each year
The following variables are declared
Currentsales: which denotes the TotalYearSales from the created GroupbyYear table
Currentyear: represent the year from the GroupbyYear table
Previous sales: The CALCULATE function evaluates the expression by filtering the value of TotalYearSales in groupby function. It then that computes the increase or decrease in current year's sales compared to the previous year. The IF performs a logical conditional function that checks that Previous Sale is not blank to avoid a divide by zero error
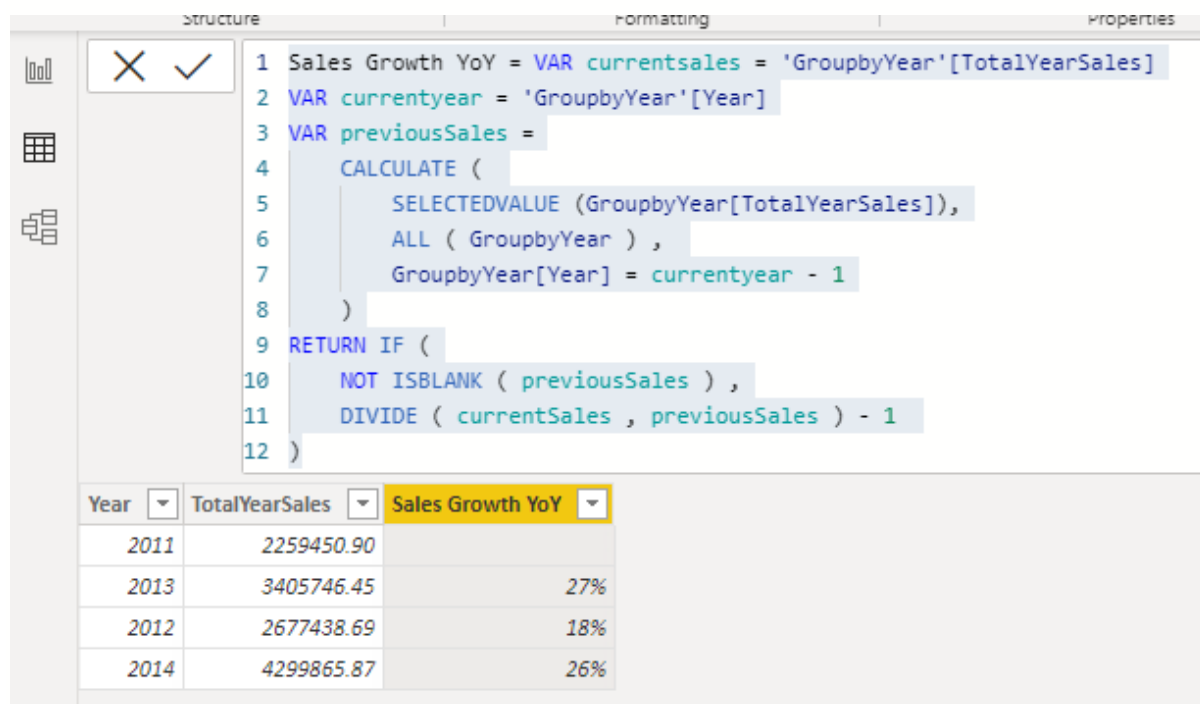
Figure 31: DAX showing the Year-on-Year Growth rate computation

DAX syntax for the Year-on-Year Growth rate
```
Sales Growth YoY = VAR currentsales = 'GroupbyYear'[TotalYearSales]
VAR currentyear = 'GroupbyYear'[Year]
VAR previousSales =
    CALCULATE (
        SELECTEDVALUE (GroupbyYear[TotalYearSales]),
        ALL ( GroupbyYear ) ,
        GroupbyYear[Year] = currentyear - 1
    )
RETURN IF (
    NOT ISBLANK ( previousSales ) ,
    DIVIDE ( currentSales , previousSales ) - 1
)
```

M-Language

The Power Query M formula language is used to build highly flexible data mashup queries. (Powerquery.io, 2022). In this solution, to categorise the profitability of the store, M-language was used to create a table from existing record, the function Table.FromRecords create a table Profit/Loss_Tracker with three columns that have been assigned with different variables.

Figure 32: M-Formula computation for Profit tracker

Figure 33: Profit tracker table

Figure 34: Profit tracker implemented as a calculated column

Dashboard

The dashboard provides a visual display of the Takinra store's data. The core aim is to provide deep-dive view of the business data. It helps business to track and analyse the performance of their business strategies using Key performance indicators, data points and KPIs. The dashboard contains different charts, graphs and other data visualisations that are simple to interpret. It also has a countdown timer, it counts toward the end of the next fiscal year. The PowerBI solution contains a homepage and three pages namely, sales analysis, product analysis and forecast and analytics. The aim is to provide insight from the store's data that can help senior managers in making better decisions.

Home Page: The homepage is the landing page for the solution. It introduces the business intelligence solution to the users and aids navigation to the appropriate page. It has links to other pages in the solution and this makes users to easily interact with the solution. The colour theme on the home page sets the tone for the entire solution.

Figure 35: Homepage

Sales Analysis page: The sales analysis provides insight into the sales performance of the store. It contains card visuals that shows the key performance indicators, due to the importance of the KPIs, the cards sit on top of the page to make it visible to business users. The page also contains charts and graphs that shows different data points and insight that relates to the sales performance of the store. The page also has some slicers that helps users drill-down into the dataset and get more insights. It also has customized tooltips enable to give more insight about data without having to move from the page
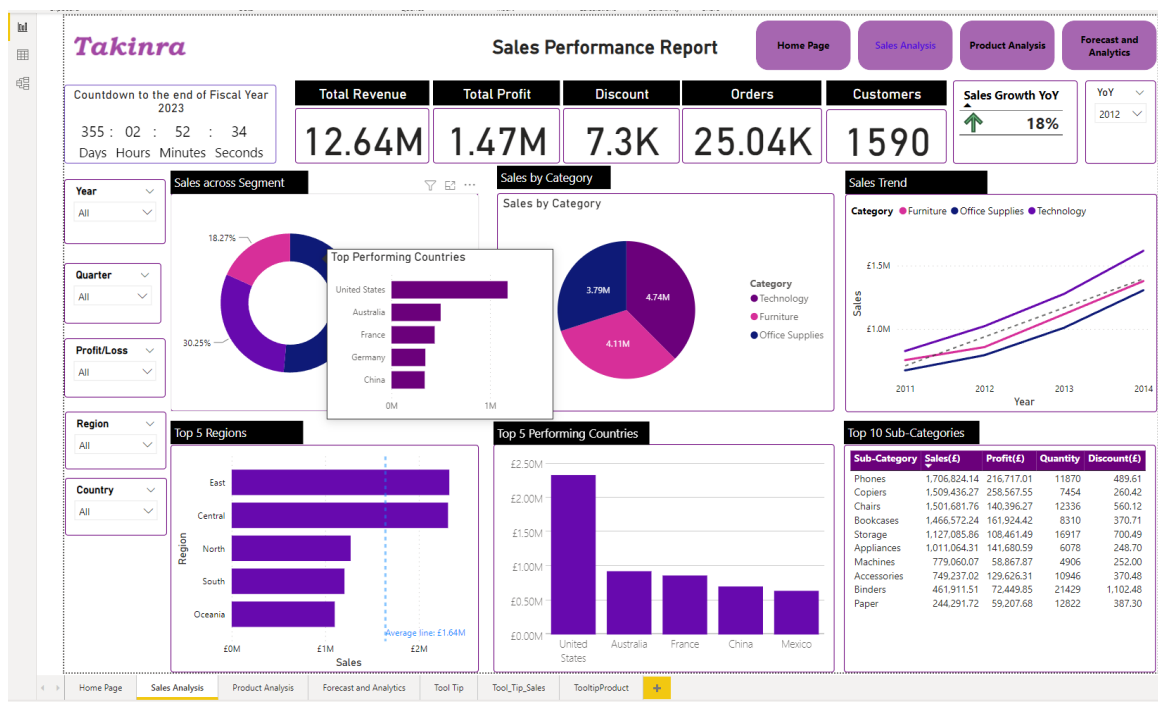
Figure 36: Sales Analysis page

Product Page: This provides details about the product offerings on sale in the store. It helps to track the number of orders handled by the store as well as the number of products sold. It analyses the sales trend across the different products. It also contains the granular details about the most performing products and details about the least performing products. It also shows the relationship between the pricing and quantity of products bought by customers.
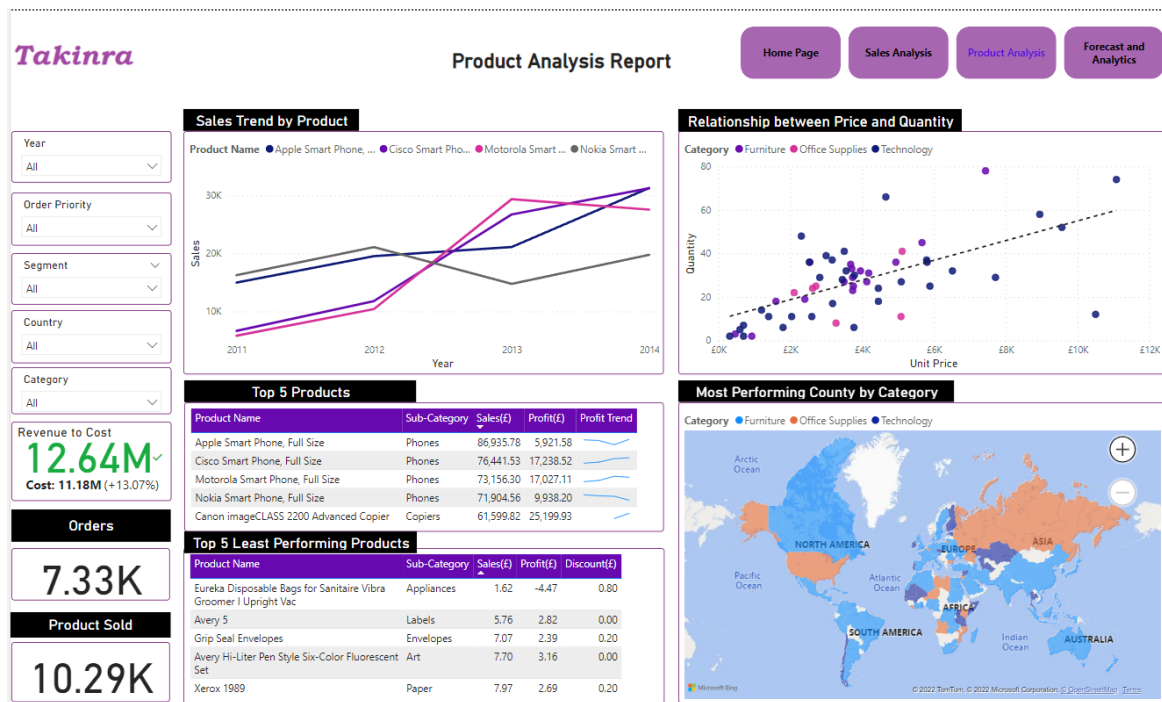
Figure 37: Product Analysis page

Forecast and Analytics: This page employs the use of artificial intelligence in analysing the store's data to get insight about key factors that can influence the sales performance of the store, the page also provides projection into the store's revenue over a period of one year. These charts help business managers in planning and setting targets for the store.
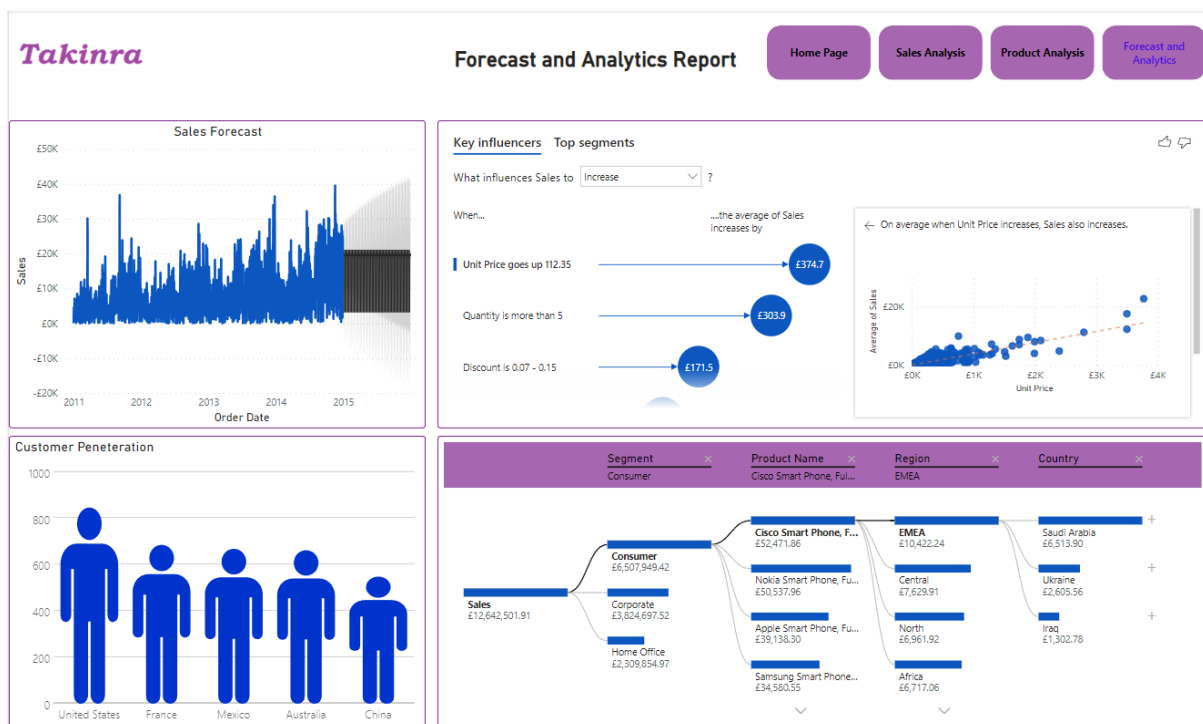

Figure 38: Forecast and Analytics

A. Use the table below to **self-assess** your work. This will help reflect on your work. <u>You must keep this table in your report.</u>

Report Section	Description	Grade your work from 0 to 100
Report Structure	The report is well-written, and it contains all the relevant sections	90
Data Pre-processing and Data Modelling	Many pre-processing steps have been applied. The data model is well-structured	95
Dax and M language	Both DAX and M Language have been extensively used in the report	95
Dashboard Design	The dashboard contains a variety of charts, including advanced ones.	95
Average		**Add below the average of the four cells above:** **94**

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