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| --- | --- | --- |
|  |  | *Sales Analyst of* |
| Submitted By: | **Clifton Chen Yi (231220B)** | Product |
|  | **Jesalva Kriston Jomari Ballesteros (231165R)** | Customer |
|  | **Wong Jun Lin (242844E)** | Shipper |
|  | **Tan Xuan Wei (243008H)** | Employee |
| Module Group: | **AA2402** |  |
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| Date of Submission: | 15/12/2024 |  |

IT1391 Data visualisation

Assignment

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# Task 1: Design a Data Model in Power BI (10 marks)

We have done the following with step-by-step documentation:

**Creating a Date Table**

1. Initial Setup

Table View > Table Tools New table (yellow highlight) > New column (blue highlight)

A screenshot of a computer

Description automatically generated

A Date Table gives us the option to easily aggregate data by month, year, or quarter. Moreover, it helps to improve performance, and ensures consistent handling of date-based calculations.

1. Date Column



The following DAX was used to define the column, it creates a row for each date between 1st January 2018 and 31st December 2020, as these were all the dates where there were sales or shipping.

1. Year Column



The following DAX was used to define the column, it simply adds the year of each date and concatenates it with the string “FY”.

1. Month, Month Key, Quarter, Day Column



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The following DAX was used to define the different columns, very straightforward.

1. Sorting the Month column by Month Key

Table View > Date Table > Select Month Column > Column tools ribbon tab > Sort by column > Select Month Key

A screenshot of a computer

Description automatically generated

The Month column often defaults to alphabetical order (E.g. April before January). Sorting it by Month Key ensures the months appear in chronological order in visuals.

1. Creating Fiscal hierarchy

Model View > Expand Date Table > Right-click Year > Create hierarchy > Rename hierarchy to “Fiscal” > Select Fiscal > Add Quarters followed by Month > Apply Level Changes

A screenshot of a computer

Description automatically generated

**Customers Table**

1. Customer Geography hierarchy for Customers

Model View > Customer Table > Right-click on Country > Create hierarchy > Rename to “Customer Geography” > Add Region followed by City > Apply Level Changes

A screenshot of a computer

Description automatically generated

1. Customer Contact Details Display Folder

Model View > Individually select the columns in the snippet below (Company Name, Contact Name, Contact Title, Fax, Phone) > Under General Properties > Display Folder > Enter “Customer Contact Details”

A screenshot of a contact details

Description automatically generated

1. Customer Address Display Folder

Model View > Individually select the columns in the snippet below (Address, Postal Code) > Under General Properties > Display Folder > Enter “Customer Address”

A screenshot of a phone

Description automatically generated

**Suppliers Table**

1. Supplier Address Display Folder

Model View > Individually select the columns in the snippet below (Address, Postal Code) > Under General Properties > Display Folder > Enter “Supplier Address”

A close-up of a computer screen

Description automatically generated

1. Sort Company Name by Supplier ID

Table View > Suppliers Table > Select Company Name > Sort by column (Supplier ID)

A screenshot of a computer

Description automatically generated

Sorting Company Name by Supplier ID ensures that the order in visuals avoids issues with duplicate names or inconsistent ordering.

1. Supplier Rank

Right-click on the Suppliers table > New measure > Enter and commit the following DAX:



1. Total Sales by Company

Right-click on the Suppliers table > New measure > Enter and commit the following DAX:



1. Number of Categories Supplied

Right-click on the Suppliers table > New measure > Enter and commit the following DAX:



**Employees Table**

1. Employee Geography Hierarchy

Model View > Employees Table > Right-click on Country > Create hierarchy > Rename to “Employee Geography” > Add Region followed by City > Apply Level Changes

A screenshot of a computer

Description automatically generated

1. Employee Address Display Folder

Model View > Individually select the columns in the snippet below (Address, Postal Code) > Under General Properties > Display Folder > Enter “Employee Address”

A screenshot of a computer

Description automatically generated

1. Personal Information Display Folder

Model View > Individually select the columns in the snippet below (Birth Date, First Name, Full Name, Last Name, Title of Country) > Under General Properties > Display Folder > Enter “Personal Information”

A screenshot of a computer

Description automatically generated

1. Employment Details Display Folder

Model View > Individually select the columns in the snippet below (Extension, Home Phone, Notes) > Under General Properties > Display Folder > Enter “Personal Information”

A screenshot of a computer

Description automatically generated

**Order Details Table**

1. Total Price

Select Order Details Table > Right-click > New column > Enter the following DAX > Commit the changes.



We need this column to help calculate the revenue contribution of each order line.

1. Customer Lifetime Value



Used for reports.

1. Sales Growth

A close up of a text

Description automatically generated

Standard report metric as well.

1. Last Order Date

Add New Column

A white background with black text

Description automatically generated

**Orders Table**

1. Order Geography Hierarchy

Model View > Orders Table > Right-click on Ship Country > Create hierarchy > Rename to “Order Geography” > Add Ship Region followed by Ship City > Apply Level Changes

A screenshot of a computer

Description automatically generated

1. Order Address Display Folder

Model View > Individually select the columns in the snippet below (Ship Address, Ship Postal Code) > Under General Properties > Display Folder > Enter “Order Address”

A close-up of a computer screen

Description automatically generated

**Products Table**

1. Stock Status

Right-click on the Products table > New column > Enter and commit the following DAX:

A screen shot of a computer

Description automatically generated

This helps differentiate products into "In Stock" or "Low Stock" categories, which betters their inventory management.

1. Total Revenue by Product

Right-click on the Products table > New measure > Enter and commit the following DAX:

A screen shot of a computer

Description automatically generated

Helps identifies the top-performing products in terms of sales revenue, so that they can plan their inventory better and marketing decisions.

1. Total Discounts Given

Right-click on the Products table > New measure > Enter and commit the following DAX:

A computer screen shot of a black screen

Description automatically generated

This helps track the total amount of discounts provided, which are important stuff for things like financial reviews and cost analysis.

1. Number of Products In Stock



A simple yet important metric.

**Categories Table**

1. Avg Sales per Product

Right-click on the Categories table > New measure > Enter and commit the following DAX:



Another useful metric for financial reports.

1. Category Rank

Right-click on the Categories table > New measure > Enter and commit the following DAX:

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Another useful metric to make more informed decisions for the business.

**General Explanations**

1. Why Use Display Folders

We used them to group related fields or measures logically, making the data model cleaner and easier to navigate for end-users. This basically enhances usability and improves organization.

1. Why Create Hierarchies

We implemented hierarchies so that users are able to drill down from a high-level category (E.g. Year) to a more granular level (E.g. Month or Day) within a single field which improves analysis and reduces complexity.

# Task 2: Design Reports in Power BI (15 marks)

A summary for this section:

1. Employee Sales Analysis by Xuan Wei
2. Product Sales Analysis by Clifton
3. Shipper Sales Analysis by Jun Lin
4. Customer Sales Analysis by Kriston

**Employee Sales Analysis by Xuan Wei**

1. Introduction:

This report is divided into three sections, each accessible via bookmarks and buttons: Top 3 Employees, Employee Sales by Country, and Employee Sales by Product Category.

Before creating the visuals, I set up a navigation page with buttons and bookmarks. The navigation consists of a rectangle shape on the side of the screen and three buttons.

After adding the elements, I changed the rectangle's colour, added text and icons to the buttons, and positioned everything along the side of the screen.

Once the navigation bar was complete, this is what my report looked like:

A white background with black and white clouds

Description automatically generated

1. Top 3 Employees (Section 1)

A blue rectangular bars with white text

Description automatically generatedA screenshot of a screenshot of a screenshot

Description automatically generated

For the first visualization, I used a bar chart with Full Name as the Y-axis and Total Sales as the X-axis. To display only the top 3 employees, I filtered Full Name by Total Sales and selected the top 3. I chose a bar chart because the length of the bars makes it easy to identify the top performers and their differences. Bar charts are visually intuitive and help viewers quickly grasp the information.

A graph of a line graph

Description automatically generated with medium confidence A screenshot of a screenshot of a screenshot

Description automatically generated

Next, I created a line chart with the same filters. I set year as the X-axis, total sales as the Y-axis, and Full Name as the legend. This allows viewers to see the top 3 employees' sales trends over the years and quickly identify who was the top performer in each year.

A screenshot of a computer

Description automatically generated

Finally, I added a slicer for viewers to filter the data. This allows insights into the top 3 employees from previous years and provides more information if needed.

A screenshot of a graph

Description automatically generated

Once completed, I created a bookmark and linked it to the "Top 3 Employees" button on the navigation bar. This ensures the visuals appear when the button is clicked. I then used the selection panel to hide the newly created visuals.

2. Sales by Employee and Country (Section 2)

A graph of blue rectangular objects

Description automatically generated with medium confidence A screenshot of a computer

Description automatically generated

The first visual on this page is a column chart comparing sales across countries. This helps viewers see total sales in each country before comparing sales by employees. I chose a column chart because it simplifies data comparison and displays totals clearly.

A map of the world with colored circles

Description automatically generated A screenshot of a computer

Description automatically generated

Next, I added a map with pie charts for each country, showing the sales of employees in those countries. A map visual provides a clear geographical context, allowing viewers to see where sales are occurring. The pie charts help viewers understand each employee's contribution to sales in each country.

A screenshot of a computer

Description automatically generated

After creating these visuals, I added a bookmark and linked it to the "Country" button. This ensures the visuals will appear when the button is clicked. I then used the selection panel to hide the newly created visuals.

1. Sales by Employee and Category (Section 3)

A graph of different colored bars

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Description automatically generated  
  
The visual in this section is a bar chart displaying the total sales of all employees, along with the sales categories that make up the total. I used a clustered bar chart because it clearly shows the contribution of each category to each employee’s sales.

A white background with black lines

Description automatically generated A white background with black lines

Description automatically generated

Additionally, two slicers, formatted as dropdowns, allow viewers to filter the data by category and year.

**Product Sales Analysis by Clifton**

1. Main Page (Sales Analysis by Product)

A screenshot of a computer

Description automatically generated

-Northwind traders logo

-Sales Analysis by Product header

-An informative summary for the visuals

* Highest Sales, Highest Quantity Sold & Total Sales and Highest Stock
* Allows Northwind Traders management to make an informed decision as to whether to expand their business globally.

1. Chart 1: Monthly Sales by Product Category

A screenshot of a computer

Description automatically generatedA graph of sales

Description automatically generated

* The area chart shows the total sales of different product categories across the months in 2019.
* Can be filtered by months and category through the use of a slicer. This is so that Northwind management will be able to have more flexibility in analysing sales volume through various timeframe and options to improve their sales and product strategies. E.g. Implement dynamic pricing to maximise total revenue during peak demand periods

1. Chart 2: Tooltip pie chart for Monthly Sales by Product Category (2019) area chartA screenshot of a computer

   Description automatically generated

* The tooltip shows the Total Sales by Country – identify the country which has the highest sales amount (customers purchasing food from NorthWind)

This enables Northwind management to focus on future marketing and investment efforts in USA.

* The tooltip also shows where least customers reside in

Northwind management can identify countries with lower sales where additional strategies (e.g., promotions, price adjustments, or better partnerships) may be required to boost sales performance.

This will in turn benefit NorthWind as a company through higher sales per month as customers will be more willing to purchase their products through more attractive and beneficial monetary incentives.

1. Chart 3 & 4: Customer Information Table & Customer Geography map [Drill Through page (Customer Details) for Monthly Sales by Product Category (2019) area chart]

A screenshot of a computer

Description automatically generated

* Allows Northwind management to view customer information such as contact name, phone, fax, address, postal code and total sales

Enables them to identify key customers who are contributing significantly to sales (provide cashback/double points earned for every purchase made within the following month) or focus on customers with lower sales for follow-up or upselling opportunities.

With contact information available, it also makes it easier for the sales team to follow up directly with customers. E.g. By sending survey to customers to inquire about their preferences of the food (different cuisines/ too salty etc.)

* The Customer Geographical map allows Northwind management to see which country/region/city has the most sales through the blue dots and open more outlet stores in shopping malls or invest more in advertising through banners, posters and signages etc so that they will be able to generate and optimise the total sales per month/year etc.
* Once u click Northwind Traders logo on the top left of the page, it redirects you to the main page.

1. Conditional formatting by background colour and icons for total sales column

|  |  |
| --- | --- |
| A screenshot of a screen  Description automatically generated | Identify customers who spent the around the least and most money in 2019.    Least spending (diamond) = red [value >=0 and <10000]  Moderate spending (triangle) = orange [value >=10000 and <21000]  Highest spending (circle) = yellow [value >=21000 and <110000] |

1. Chart 5: Sum of Quantity Sold and Total Sales by Product Name

A graph with orange lines and black text

Description automatically generated A screenshot of a computer

Description automatically generated

* This Line and Stacked column chart shows the Sum of Quantity Sold and Total Sales by product name.
* Northwind management can filter by product name

1. Chart 6: Average Quantity & Sales / Month by Product Name [Drill Through page (Quantity and Total Sales Details) for Sum of Quantity Sold and Total Sales by Product Name line and stacked column chart]

A screenshot of a computer screen

Description automatically generated

From the Sum of Quantity Sold and Total Sales by Product Name line and stacked column chart, users can select the Gnocchi di nonna Alice bar as product name to analyse, right click and choose drill through. They will be able to see the above picture indicating the quantity sold and total sales per month for Gnocchi di nonna Alice.

A screenshot of a graph

Description automatically generated

* This line and stacked (combo) chart shows users the quantity for each product sold and the total sales for each month for every product.
* The chart can be filtered by product name and month to analyse specific products and the sales they generate per month to make informed decisions to improve and enhance sales growth and strategies.

1. Chart 7: Sum of Units in Stock by Product Name

|  |  |
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| A screenshot of a calendar  Description automatically generated | A chart with yellow bars  Description automatically generated with medium confidence |

This clustered bar chart shows the sum of units in stock by product name. Users can filter by not only product name but also category name or month using a slicer.

1. Chart 8 & 9: Supplier Information Table & Sum of Units in Stock by Product Name [Drill Through page (Stock Details) for Sum of Units in Stock by Product Name clustered bar chart]

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Description automatically generated

* Sum of Units in Stock by Product

Allows Northwind management to facilitate inventory management. For e.g. if a product has low stock levels (seen in the clustered bar graph), the drill-through page provides immediate access to the supplier's contact information (supplier information table), making it easier to place restock orders or address supply chain issues.

* Sum of Quantity by Supplier Company clustered column chart can be filtered by Product Name.
* Those bars which are in red alerts the management that for some products, the stock level is <=20 and they need to re-order more stocks from the relevant suppliers.

Bookmark as Buttons

|  |  |
| --- | --- |
| A screenshot of a computer  Description automatically generated  A logo of a company  Description automatically generated | * Created a bookmark for all pages. * Assigned all back buttons (Northwind Traders logo to Main Page –Sales Analysis by Product) for all drill through pages (Quantity and Total Sales Details, Customer Details & Stock Details) when users click the logo. |

**Shipper Sales Analysis by Jun Lin**

1. Page 1 - Suppliers’ Country of Origin and Sales

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Description automatically generated

Top Company: The supplier with the highest sales is Plutzer Lebensmittelgroßmärkte AG from Germany, with total sales of $132K.

Top Countries:

The top three countries with the most sales are:

1. France

2. Germany

3. Australia

These countries contribute the most to the overall supplier sales.

1. Page 2 - Categories Supplied by Supplier

A screenshot of a computer

Description automatically generated

Total Product Category Count:

A total of 77 product categories are supplied by all the suppliers combined.

Product Category Supplied Most:

The most supplied category is Confections, showing strong demand for this product type.

1. Page 3 - Products Supplied by Supplier

A screenshot of a computer

Description automatically generatedMost Stocked Product:

The product with the highest stock is Rhönbräu Klosterbier, with 125 units currently available.

Company with Most Products in Stock:

Svensk Sjöföda AB has the largest stock overall, holding 224 units across all its products.

**Customer Sales Analysis by Kriston**

A screenshot of a computer

Description automatically generated

1. Lead Sales Bin

The majority of sales fall within the $501 - $1000 bin, indicating that most customers place medium-value orders.

This sales bin contributes significantly to total revenue, suggesting a stable customer base with moderate purchasing power.

1. Top Customers

Jose Pavarotti and Roland Mendel are the top-performing customers. Together, they account for a significant portion of total sales, highlighting their importance to the business.

Prioritizing these customers with retention strategies, such as loyalty programs or personalized offers, can help sustain their strong contributions.

1. Regions with Most Sales

Europe is the region generating the highest sales. This emphasizes the region’s importance as a core market. Further opportunities could include expanding product offerings or strengthening marketing campaigns in Europe to maximize revenue.

1. Insights

**Sales Distribution:** The dominance of the $501 - $1000 sales bin suggests that most customers are mid-range spenders. Strategies to increase their order value, such as bundle deals or discounts for larger purchases, could drive higher revenue.

**Customer Focus:** Top customers like Jose Pavarotti and Roland Mendel play a critical role in sales. Maintaining strong relationships with them is essential for long-term growth.

**Regional Strategy:** Europe’s strong performance reinforces its value as a strategic focus area. Additional investments in this region could yield high returns.

# Task 3: Video Presentation on the Data Analysis in Power BI (15 marks)

The following are the links for the individual presentation video.

1. Video clip link of the Analysis Report of Xuan Wei

<https://www.youtube.com/watch?v=MJbnI0Cmb4Q>

1. Video clip link of the Analysis Report of Clifton

<https://drive.google.com/file/d/1_DqmBGIzoCYWJNQt5ZQmn5u0-rCFlhai/view?usp=drive_link>

1. Video clip link of the Analysis Report of Jun Lin

Submitted through Brightspace.

1. Video clip link of the Analysis Report of Kriston

<https://youtu.be/R-teOUMyoiM>