**Practical Experiments for Supermarket Sales Dataset in Power BI:**

Dataset Link: https://www.kaggle.com/datasets/faresashraf1001/supermarket-sales

Experiment 1: Sales Performance by Branch and Time Period

• **Objective**: Identify which branches perform best during specific time periods (e.g., monthly, quarterly) and uncover seasonal trends.

• **Steps**:

1. **Load Data**: Import the supermarket sales dataset into Power BI.

2. **Create Date Hierarchy**: In **Data View**, ensure the **Date** column has a hierarchy (Year, Quarter, Month). If not, create one using **Modeling** > **New Column** or Power Query.

3. **Visualize**:

▪ Add a **Clustered Column Chart**.

▪ Drag **Branch** to **Axis**, **Total Sales** to **Values**, and **Date** (Month or Quarter) to **Legend**.

▪ Add a **Slicer** visual with **Year** or **Quarter** to filter time periods dynamically.

4. **Analyze**: Use the slicer to compare sales across branches for different months or quarters.

5. **Drill Down**: Right-click a column to drill into specific months or weeks for a branch.

• **Expected Outcome**: Discover which branches consistently outperform others (e.g., Branch A peaks in Q4 due to holidays) and identify underperforming branches. • **Visualization Used**: Clustered Column Chart, Slicer.

• **Skill Learned**: Date hierarchies, slicers, drill-down functionality.

Experiment 2: Impact of Customer Type on Sales and Profitability

• **Objective**: Compare sales and gross margin between **Member** and **Non-Member** customers to inform loyalty program strategies.

• **Steps**:

1. **Prepare Data**: Ensure **Customer Type** and **Gross Margin** columns are clean. In Power Query, check for consistent values (e.g., no typos like “member” vs. “Member”).

2. **Create Measures**:

▪ In **Modeling**, create a measure: Avg Margin = AVERAGE('Table'[Gross Margin]).

▪ Create another: Total Sales = SUM('Table'[Total Sales]).

3. **Visualize**:

▪ Add a **Matrix** visual.

▪ Drag **Customer Type** to **Rows**, **Total Sales** and **Avg Margin** to **Values**. ▪ Add a **Pie Chart** with **Customer Type** to **Legend** and **Total Sales** to **Values**.

4. **Filter**: Add a **Slicer** for **Product Category** to see if customer type impacts specific categories differently.

5. **Analyze**: Compare sales volume and profitability for Members vs. Non Members.

• **Expected Outcome**: Determine if Members contribute higher sales or margins (e.g., Members buy more in Electronics with 25% higher margins), suggesting loyalty program expansion.

• **Visualization Used**: Matrix, Pie Chart, Slicer.

• **Skill Learned**: DAX measures, cross-filtering, matrix formatting.

Experiment 3: Geographic Sales Analysis with Map

• **Objective**: Explore sales distribution across cities and identify high-potential regions for expansion.

• **Steps**:

1. **Verify Data**: In **Data View**, set **City** column’s **Data Category** to **City** for geographic recognition.

2. **Visualize**:

▪ Add a **Map** visual (or **ArcGIS Map** for advanced features).

▪ Drag **City** to **Location** and **Total Sales** to **Size** or **Color Saturation**. ▪ Add a **Card** visual for **Total Sales** to show overall sales.

3. **Enhance**:

▪ Add a **Slicer** for **Branch** to filter by store location.

▪ Use **Tooltips**: Drag **Rating** and **Product Category** to **Tooltips** for additional context on hover.

4. **Experiment**: Toggle branches in the slicer to see how sales vary by city and branch.

5. **Analyze**: Identify cities with high sales but low branch presence.

• **Expected Outcome**: Pinpoint cities like New York with high sales density, suggesting potential for new branches or marketing focus.

• **Visualization Used**: Map, Card, Slicer.

• **Skill Learned**: Geographic visualizations, tooltips, data categorization. Experiment 4: Payment Method Trends and Customer Satisfaction

• **Objective**: Analyze the relationship between **Payment Method** and **Rating** to optimize payment options.

• **Steps**:

1. **Prepare Data**: Ensure **Payment Method** and **Rating** are numeric (Rating as Average).

2. **Create Measure**: In **Modeling**, create Avg Rating = AVERAGE('Table'[Rating]).

3. **Visualize**:

▪ Add a **Clustered Bar Chart**.

▪ Drag **Payment Method** to **Axis**, **Total Sales** to **Values**, and **Avg Rating** to **Secondary Values** (use dual-axis).

▪ Add a **Funnel Chart** with **Payment Method** to **Category** and **Total Sales** to **Values**.

4. **Filter**: Add a **Slicer** for **Date** (Year/Month) to track changes over time. 5. **Analyze**: Check if certain payment methods (e.g., Mobile Payment) correlate with higher ratings.

• **Expected Outcome**: Find that Mobile Payments have higher ratings (e.g., 8/10 vs. 7/10 for Cash), suggesting investment in mobile payment infrastructure.

• **Visualization Used**: Clustered Bar Chart, Funnel Chart, Slicer.

• **Skill Learned**: Dual-axis charts, funnel analysis, time-based filtering. Experiment 5: Product Category Profitability with Conditional Formatting

• **Objective**: Identify the most profitable product categories and highlight outliers using conditional formatting.

• **Steps**:

1. **Create Measures**:

▪ Total Margin = SUM('Table'[Gross Margin] \* 'Table'[Total Sales]). ▪ Avg Sales per Transaction = AVERAGE('Table'[Total Sales]).

2. **Visualize**:

▪ Add a **Table** visual.

▪ Drag **Product Category**, **Total Sales**, **Total Margin**, and **Avg Sales per Transaction** to **Values**.

▪ Apply **Conditional Formatting**:

▪ Select **Total Margin** > **Background Color** > Color Scales (e.g.,

green for high, red for low).

▪ Repeat for **Avg Sales per Transaction** using **Data Bars**.

3. **Sort**: Sort the table by **Total Margin** descending.

4. **Filter**: Add a **Slicer** for **Branch** to compare across stores.

5. **Analyze**: Identify categories with high margins but low sales volume. • **Expected Outcome**: Discover that Electronics have high margins (30%) but lower sales volume, suggesting targeted promotions.

• **Visualization Used**: Table, Slicer.

• **Skill Learned**: Conditional formatting, table sorting, profitability analysis.

Experiment 6: Interactive Dashboard with Bookmarks

• **Objective**: Build an interactive dashboard combining multiple visuals and use bookmarks for dynamic storytelling.

• **Steps**:

1. **Create Visuals**:

▪ Add visuals from Experiments 1–5 (e.g., Column Chart for Sales by Category, Map for Sales by City, KPI Cards for Total Sales and Avg Rating).

▪ Arrange visuals on a single report page for a cohesive dashboard.

2. **Add Interactivity**:

▪ Add **Slicers** for **Date**, **Branch**, and **Customer Type**.

▪ Enable **Sync Slicers** across visuals (View > Sync Slicers).

3. **Use Bookmarks**:

▪ Create a “Sales Overview” bookmark: Select all visuals, go to **View** > **Bookmarks Pane** > **Add** > Name it.

▪ Create a “Branch Focus” bookmark: Filter to one branch using slicers, add another bookmark.

▪ Add buttons (Insert > Buttons) to toggle between bookmarks.

4. **Test**: Click buttons to switch views and use slicers to explore data.

• **Expected Outcome**: A user-friendly dashboard that allows stakeholders to explore sales by branch, time, or customer type with one click.

• **Visualization Used**: All previous visuals, Slicers, Buttons.

• **Skill Learned**: Dashboard design, bookmarks, interactivity.

**Practical Notes**

• **Dataset Size**: Ensure the dataset has enough rows (e.g., 1,000+ transactions) for meaningful insights. If small, create synthetic data in Excel.

• **Performance**: For large datasets, optimize by removing unused columns in Power Query and using aggregations.

• **Sharing**: Save the Power BI file (.pbix) or publish to **Power BI Service** (requires account) for collaboration.

• **Learning Resources**: Use Microsoft’s Power BI documentation or free tutorials on YouTube for DAX and advanced visuals.