COMPLETE STEP-BY-STEP GUIDE TO CREATE DASHBOARD FROM THE FINANCIAL DATASET

📘 **INDEX** **– POWERBI_NOTES_BY_SAKIR_MANSURI**

📖 HOW TO READ & USE THESE NOTES (Simple Guide)

These notes are designed for **students, beginners, working professionals, and Power BI learners**.
Here is the simplest way to follow them:

1. Start from Phase 1 → Clean Your Dataset First

Power BI dashboards are ONLY as good as your data.
So Phase 1 teaches you:

- How to clean dirty text
- Fix wrong data types
- Remove blank rows
- Create new logical columns

This builds the foundation.

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2. Move to Phase 2 → Build Dimensions

To create a **Star Schema**, you must separate:

- Country → GeographyDim
- Segment → SegmentDim
- Product → ProductDim

This improves:

- Performance
- Flexibility
- Accuracy of relationships

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3. Phase 3 → Create a Date Table (Important!)

Time intelligence (YoY, YTD, QTD) only works properly **if you create a real Date Table**.
Follow the provided DAX formula and mark it as the official date table.

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4. Phase 4 → Build Relationships

Connect all your dimensions to the main **FinancialData** table.
This step decides whether your dashboard will work correctly or show wrong numbers.

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5. Phase 5 → Create Measures

Do NOT use raw columns for visuals.
Use:

- Total Sales
- Total Profit
- Profit Margin %
- YoY Growth
- Discount Rate

These measures make the dashboard dynamic and accurate.

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6. Phase 6 → Validate Your Data

Before building the dashboard:

- Check for blanks
- Check duplicates
- Check filter direction
- Check if date table works

This helps avoid mistakes later.

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7. Build the 6-Page Dashboard (Final Output)

Each dashboard page has:

- Visuals
- Use-cases
- Insights

- Business questions answered

You can follow the same sequence or customize as needed.

📂 DATASET INFORMATION

The dataset used in this project is included in the GitHub repository.

📂 File Name:

Financial messy data.xlsx

📍 Open the folder:

/Dataset

You will find the raw file needed to follow all steps in this guide.

📎 G-DRIVE BACKUP LINK

If anyone cannot download from GitHub due to network restrictions, a backup Google Drive link is also provided:

👉 G-Drive Dataset & Notes Link:

https://drive.google.com/drive/folders/1ULEKl57KXCANtaQ2MD292qqpj-nVqVGM?usp=drive_link

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📝 NOT ALL STEPS ARE MANDATORY

These notes are designed to be **flexible**.
Depending on your project requirements:

- You may skip some dimension tables
- You may add more measures
- You may reduce visuals
- You may keep only 1 or 2 dashboard pages

This guide helps you **build a complete professional dashboard**, but you can adjust it to your needs.

PHASE 1: DATA CLEANING IN POWER QUERY

Step 1: Load Data into Power BI

1. Open Power BI Desktop
2. Click **Home** → **Get Data** → **Excel**
3. Select your "Financial messy data.xlsx" file
4. Select the "Financial Data" sheet and click **Transform Data**

Step 2: Split Segment-Country Column

powerquery

- Select "Segment-Country" column

- Go to **Transform** tab → **Split Column** → **By Delimiter**

- Choose delimiter: **Custom** → Enter "-"

- Split at: **Each occurrence of the delimiter**

- New column names: "Segment", "Country"

Step 3: Clean Text Values

powerquery

- Select "Country" column → **Transform** → **Replace Values**

  - Replace "USA" with "United States of America"

  - Replace "Germany" with "Germany" (ensure consistency)

- Select "Product" column → **Transform** → **UPPERCASE**

  - Then replace variations: "CARRtera" → "CARRETERA", "Carretera" → "CARRETERA"

  - "MoNTANA" → "MONTANA", "mONtana" → "MONTANA"

  - "PAseO" → "PASEO", "Paseo" → "PASEO"

Step 4: Clean Numeric Values

powerquery

- Select "Manufacturing Price" column → **Replace Values**

- Replace `"3"` with `3` (remove quotes)

- Ensure all numeric columns have correct data types:

  - Units Sold, Manufacturing Price, Sale Price, Gross Sales, Discounts, Sales, COGS, Profit → Decimal Number

Step 5: Remove Empty Rows

powerquery

- Go to **Home** → **Remove Rows** → **Remove Blank Rows**

Step 6: Add Discount Category Column

powerquery

- Go to **Add Column** → **Conditional Column**

- New column name: "Discount Category"

- If [Discounts] > 0 then "Discounted" else "Full Price"

Step 7: Rename Main Query

powerquery

- In Query Settings, rename query to "FinancialData"

- Click **Close & Apply**

PHASE 2: CREATE DIMENSION TABLES IN POWER QUERY

Step 8: Create Geography Dimension

powerquery

1. Right-click "FinancialData" query → **Duplicate**

2. Rename to "GeographyDim"

3. Remove all columns except "Country"

4. **Home** → **Remove Rows** → **Remove Duplicates**

5. **Add Column** → **Index Column** → Rename to "GeographyKey"

6. Reorder columns: GeographyKey, Country

Step 9: Create Segment Dimension

powerquery

1. Right-click "FinancialData" query → **Duplicate**

2. Rename to "SegmentDim"

3. Remove all columns except "Segment"

4. **Remove Duplicates**

5. **Add Column** → **Index Column** → Rename to "SegmentKey"

6. Reorder columns: SegmentKey, Segment

Step 10: Create Product Dimension

powerquery

1. **Home** → **Enter Data**

2. Create this table:

Product	Category
AMARILLA	City Bikes
CARRETERA	Road Bikes
MONTANA	Mountain Bikes
PASEO	Touring Bikes
VELO	Racing Bikes
VTT	All-Terrain Bikes

3. Name: "ProductDim"

4. Click **Load**

PHASE 3: CREATE DATE TABLE WITH DAX

Step 11: Create Date Table

dax

```
DateTable =
ADDCOLUMNS (
    CALENDAR (DATE(2013,1,1), DATE(2014,12,31)),
    "Year", YEAR([Date]),
    "MonthNumber", FORMAT([Date], "MM"),
    "MonthName", FORMAT([Date], "MMMM"),
    "Quarter", "Q" & QUARTER([Date]),
    "YearQuarter", FORMAT([Date], "YYYY") & "-Q" & QUARTER([Date]),
    "MonthYear", FORMAT([Date], "YYYY-MM")
)
```

Mark as Date Table:

- Right-click DateTable → **Mark as date table** → Select "Date" column

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PHASE 4: CREATE RELATIONSHIPS

Step 12: Build Data Model

Go to **Model View** and create these relationships:

FinancialData[Date] → DateTable[Date] (Many to One)

FinancialData[Product] → ProductDim[Product] (Many to One)

FinancialData[Country] → GeographyDim[Country] (Many to One)

FinancialData[Segment] → SegmentDim[Segment] (Many to One)

Verify:

- All relationships should show "1" on dimension side and "*" on fact table side
- Enable cross-filtering direction: **Both** (or Single from dimension to fact)

PHASE 5: CREATE DAX MEASURES

Step 13: Create Base Measures

dax

-- Basic Measures

Total Sales = SUM(FinancialData[Sales])

Total Profit = SUM(FinancialData[Profit])

Total Units Sold = SUM(FinancialData[Units Sold])

Total COGS = SUM(FinancialData[COGS])

Total Discounts = SUM(FinancialData[Discounts])

-- Ratio Measures

Profit Margin % = DIVIDE([Total Profit], [Total Sales], 0)

Average Sale Price = DIVIDE([Total Sales], [Total Units Sold])

Discount Rate % = DIVIDE([Total Discounts], [Total Sales], 0)

-- Time Intelligence

Sales PY = CALCULATE([Total Sales], SAMEPERIODLASTYEAR('DateTable'[Date]))

Sales Growth % = DIVIDE([Total Sales] - [Sales PY], [Sales PY], 0)

-- Segment Analysis

Sales per Segment =

CALCULATE([Total Sales], ALLEXCEPT(FinancialData, SegmentDim[Segment]))

-- Product Analysis

Product Profitability =

DIVIDE([Total Profit], [Total Sales])

Step 14: Format Measures

- Select each measure and format appropriately:
    - Currency measures: **Currency** ($)
    - Percentage measures: **Percentage** (%)
    - Whole numbers: **Whole Number**

PHASE 6: DATA VALIDATION

Step 15: Verify Data Quality

dax

-- Create validation measures

Data Quality Check =

VAR TotalRows = COUNTROWS(FinancialData)

VAR NullSales = CALCULATE(COUNTROWS(FinancialData), ISBLANK(FinancialData[Sales]))

RETURN DIVIDE(NullSales, TotalRows, 0)

-- Check in a card visual: Should be 0% or very low

Step 16: Test Relationships

- Create a simple matrix:
    - Rows: DateTable[MonthName]
    - Values: [Total Sales]
- Should show sales data for all months without blanks

✅ CURRENT STATUS CHECKLIST

After completing all above steps, you should have:

Tables:

- ✅ FinancialData (Fact table)
- ✅ DateTable (Date dimension)
- ✅ GeographyDim (Geography dimension)
- ✅ SegmentDim (Segment dimension)
- ✅ ProductDim (Product dimension)

Relationships:

- ✅ All dimensions connected to fact table
- ✅ Date table marked as date table

Measures:

- ✅ All base measures created and formatted
- ✅ Time intelligence working
- ✅ Data validation complete

Data Quality:

- ✅ No null values in key columns
- ✅ Consistent text formatting
- ✅ Correct data types
- ✅ Proper relationships established

🎯 READY FOR DASHBOARD BUILDING

Your data model is now **optimized for the multi-page dashboard**! The star schema is complete with:

- **1 Fact Table**: FinancialData
- **4 Dimension Tables**: DateTable, GeographyDim, SegmentDim, ProductDim
- **Proper Relationships**: All dimensions connected to facts
- **DAX Measures**: Ready for advanced calculations

Now you're ready! 🚀

Starting with:

1. **Executive Overview** (Quick wins and top-level insights)
2. **Sales Performance & Geography** (Regional analysis)
3. **Product Analysis** (Portfolio optimization)
4. **Customer Segments** (Segment strategy)
5. **Discount Strategy** (Pricing optimization)
6. **Time Intelligence** (Trends and forecasting)

📊 **Multi-Page Dashboard Structure**

Page 1: Executive Overview 📈

Top-level KPIs and trends for quick decision-making

Visualizations:

- **KPI Cards**: Total Sales, Total Profit, Profit Margin %, YoY Growth
- **Sales Trend**: Monthly sales with PY comparison (line chart)
- **Profit by Segment**: Donut chart
- **Sales by Country**: Map visual
- **Top 5 Products by Profit**: Horizontal bar chart
- **Discount Impact**: Discounted vs Full Price sales comparison

Filters Panel:

- Date Range (Year, Quarter, Month)
- Country
- Segment
- Product Category

Page 2: Sales Performance & Geography 🗺️

Deep dive into regional and customer segment performance

Visualizations:

- **Sales Heat Map by Country**: Intensity by sales volume
- **Segment Performance by Country**: Stacked bar chart
- **Top 10 Most Profitable Countries**: Bar chart
- **Sales vs Profit Scatter Plot** by country/segment
- **Regional Performance Matrix**: Country × Segment × Sales

Insights to Highlight:

- Which countries have the highest profit margins?
- Which segments perform best in each region?
- Underperforming regions needing attention

Page 3: Product Analysis 🚴

Product portfolio performance and optimization

Visualizations:

- **Product Category Performance**: Sales vs Profit margin
- **Price Point Analysis**: Manufacturing Price vs Sale Price distribution
- **Units Sold vs Profit Scatter Plot** by product
- **Seasonal Product Performance**: Which products sell best by month/quarter
- **Discount Effectiveness**: How discounts impact sales volume and profit

Key Questions Answered:

- Which products have the best ROI?
- Are we pricing products optimally?
- How do discounts affect different product categories?

Page 4: Customer Segments 👥

Segment-specific insights and targeting opportunities

Visualizations:

- **Segment Profitability**: Profit margin by segment
- **Sales Trend by Segment**: Line chart over time
- **Average Transaction Value** by segment
- **Segment × Product Category Matrix**: Heat map
- **Customer Lifetime Value Indicators**: Repeat patterns by segment

Strategic Insights:

- Most valuable customer segments
- Growth opportunities by segment
- Segment-specific pricing strategies

Page 5: Discount Strategy & Promotions 💰

Analyzing the impact of discounting on business performance

Visualizations:

- **Discount Band Performance**: Sales and profit by discount level (None, Low, Medium, High)
- **Discount Effectiveness by Product Category**
- **Profit Margin vs Discount Level**: Scatter plot
- **Seasonal Discount Impact**: When do discounts work best?
- **Discount ROI**: Revenue gained vs profit lost

Actionable Insights:

- Optimal discount levels for each product category
- When to run promotions for maximum impact
- Discount strategies that preserve profitability

Page 6: Time Intelligence & Forecasting 📅

Trend analysis and predictive insights

Visualizations:

- **YoY Growth Trends**: By month, quarter, product, segment
- **Moving Averages**: 3-month and 6-month sales trends
- **Seasonality Patterns**: Monthly performance heat map
- **Forecast Models**: Next 6 months sales prediction
- **Sales Funnel Analysis**: Units Sold → Gross Sales → Net Sales → Profit

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Interactive Features

Cross-Filtering & Drill-Through:

- Click any visual to filter all other visuals on the page
- **Drill-Through Pages**: Right-click → "Drill Through" to detailed views
- **Tooltip Pages**: Hover over elements for detailed tooltip pages

Bookmarks & Buttons:

- **Navigation Buttons**: Between pages
- **View Switchers**: Switch between different chart types
- **Reset All Filters** button on each page

🔗 Additional DAX Measures Needed

-- For Executive Overview

1. Average Sale Price = DIVIDE([Total Sales], [Total Units Sold])

2.Sales per Segment = CALCULATE([Total Sales], ALLEXCEPT('Financial Data', 'SegmentDim'[Segment]))

-- For Product Analysis

1. Product Profitability Ratio = DIVIDE([Total Profit], [Total Sales])

2. Discount Sensitivity =

VAR DiscountedSales = CALCULATE([Total Sales], 'Financial Data'[Discounts] > 0)

RETURN DIVIDE(DiscountedSales, [Total Sales])

-- For Time Intelligence

1. Sales YTD = TOTALYTD([Total Sales], 'DateTable'[Date])

2. Sales QoQ Growth =

VAR CurrentQuarter = [Total Sales]

VAR PreviousQuarter = CALCULATE([Total Sales], PREVIOUSQUARTER('DateTable'[Date]))

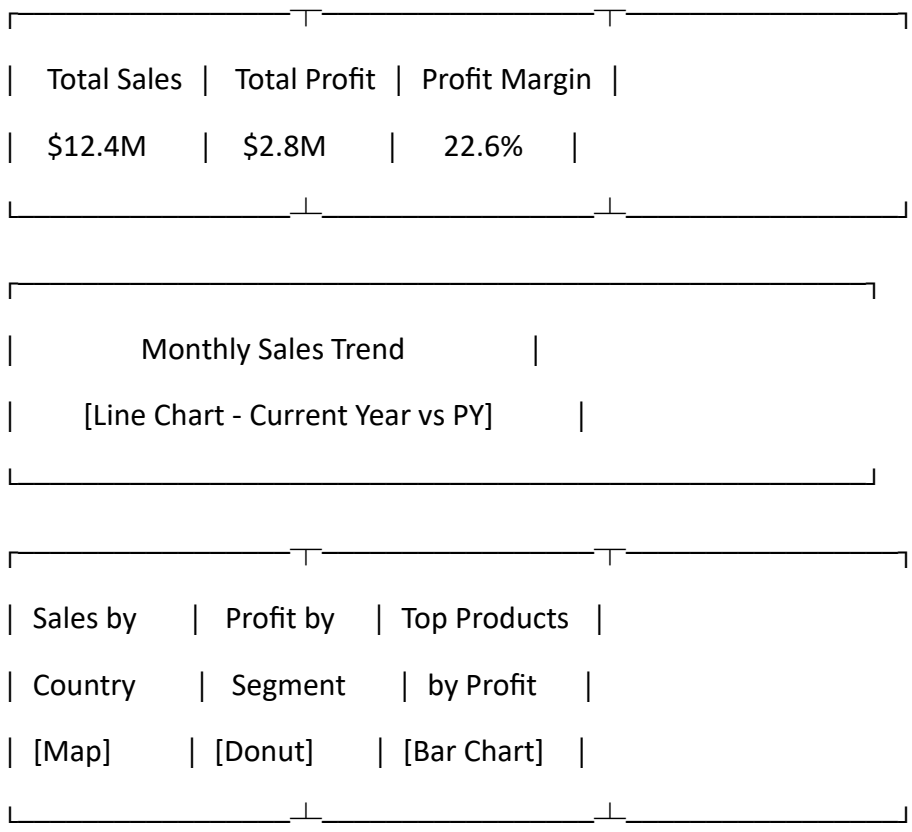
RETURN DIVIDE(CurrentQuarter - PreviousQuarter, PreviousQuarter)

🎨 Design Principles

- **Color Scheme**: Consistent color palette across all pages
- **Layout**: Clean, grid-based layout with proper white space
- **Hierarchy**: Important metrics larger and at the top
- **Mobile Responsive**: Ensure it works on tablets
- **Brand Alignment**: Use company colors and logos

📱 Sample Page Layout (Executive Overview)

text



TOP ROW - KPI CARDS

1. **Total Sales** = SUM(Sales)
    - *Shows: Overall business size*
    - *Answers: How much revenue we generated*
2. **Total Profit** = SUM(Profit)
    - *Shows: Actual money made*
    - *Answers: How profitable we are*
3. **Profit Margin %** = Total Profit / Total Sales
    - *Shows: Efficiency of sales*
    - *Answers: How much profit per dollar sold*
4. **Sales Growth %** = (Current Year - Previous Year) / Previous Year
    - *Shows: Business trajectory*
    - *Answers: Are we growing or declining?*

MAIN CHARTS

5. **Monthly Sales Trend**
    - X: Month, Y: Sales + Previous Year Sales
    - *Shows: Seasonal patterns & growth*
    - *Answers: When do we sell most? Growing YoY?*
6. **Sales by Country Map**
    - Location: Country, Size: Sales

- *Shows: Geographic performance*
- *Answers: Where are our strongest markets?*

7. **Profit by Segment** (Donut)
    - Segment vs Profit
    - *Shows: Which customer types are most profitable*
    - *Answers: Should we focus on Enterprise or Government?*
8. **Top Products by Profit** (Bar)
    - Product Category vs Profit
    - *Shows: Best-performing products*
    - *Answers: Which products drive our profit?*
9. **Discount Impact** (Columns)
    - Discounted vs Full Price (Sales & Profit)
    - *Shows: Effect of discounts*
    - *Answers: Do discounts help or hurt profitability?*

FILTERS (Left Side)

- Year, Quarter, Country, Segment, Product Category
- *Purpose: Slice data to see specific scenarios*

INSIGHTS YOU'LL GET:

- Best/worst performing countries
- Most profitable customer segments
- Optimal product mix
- Discount strategy effectiveness
- Seasonal business patterns
- Growth trends

BUSINESS QUESTIONS ANSWERED:

- Where should we expand?
- Which customers to focus on?
- Which products to promote?
- When to run promotions?
- Is our pricing strategy working?