Digital Egypt Pioneers Initiative (DEPI) 

Power BI (Data analysis program)

Code: DEPI\_ALX2\_DAT2\_S3

Analytics Avengers

Task 3: Results & Outcomes Report

Project Info :Optimizing supply chain process through Data analysis

Dataset used: Indian companies data that involving in the supply chain process

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# • Executive Summary:

This project analyzes product sales, shipping methods, supplier performance, and manufacturing metrics to optimize supply chain efficiency and profitability. The analysis revealed key issues in high shipping costs (especially via air), certain suppliers with high defect rates, and products with low profitability despite high sales. Insights aim to support cost reduction and improved supplier management.

# • Introduction:

This report aims to address the business problem of inconsistent profit margins, high shipping costs, and unreliable supplier performance. The objective is to use data analytics to identify cost drivers and operational inefficiencies.

Using Power BI and data preprocessing in Excel/Python, the dataset was explored to extract insights across supply, production, and shipping stages. Data analysis plays a critical role in guiding strategic decisions regarding supplier selection, inventory control, and cost reduction.

# • Methodology:

**Data Source**: A structured dataset containing 100 product records including product types, SKU, sales data, supplier information, shipping, and manufacturing metrics.

**Preprocessing**: Cleaning nulls, calculating profit, and categorizing shipping modes.

**Tools Used:** Power BI for visualizations,

**Key Metrics Created:**

Profit per product = Revenue - (Manufacturing cost + Shipping cost + Other costs)

Defect rate per supplier

Average shipping cost by mode and route

# • Summary of Key Findings:

- Supplier 4 showed the worst performance with 0% reliability and the highest performance variability (7.7).

- All products from Supplier 4 failed inspection tests, leading to significant quality issues.

- Supplier 1 had the highest revenue (157.5K) and showed better reliability (48.1%) than Supplier 4.

- Route B had the highest transportation cost for Supplier 1.

- Skincare products generated the most revenue across suppliers.

- Supplier 4 had the highest average manufacturing lead time (15.33 days).

- Skincare products were the most manufactured and sold items.

- A noticeable gap exists between production volumes and timely delivery.

- Highest inventory costs are associated with skincare and haircare categories.

- Inventory turnover ratio varies widely across categories, affecting cash flow.

- 'Prefer not to say' gender group generated the highest revenue (173.09K).

- Female customers purchased the most products (12,801 units).

- Skincare is the top-selling category across all genders, except 'prefer not to say', where haircare leads.

# • Visualizations & Dashboards:

Chart 1: Supplier vs. Defect Rate (Bar Chart)

Shows average defect rate per supplier.

Important to evaluate supplier quality.

RQ Answered: Which suppliers are causing the highest product defects?

Chart 2: Shipping Mode vs. Cost (Column Chart)

Shows cost distribution per transportation mode.

Highlights air shipping as the most expensive.

RQ Answered: How do shipping methods affect cost?

Chart 3: Product Profitability (Table with Conditional Formatting)

Lists products with profit calculation.

Identifies unprofitable products needing review.

RQ Answered: Which products yield the lowest profits?

# • Trends and Patterns:

* High shipping costs are consistent with air freight and Route C.
* Defect rates cluster around a few suppliers—indicating clear quality variation.
* No seasonal pattern detected due to the flat data structure.

# • Key Problems:

- High defect rates and 0% reliability in Supplier 4.

- Variability in manufacturing lead times across suppliers.

- Inconsistent manufacturing times lead to planning inefficiencies.

- Overstocking in low-demand categories increases storage costs.

- Uneven targeting across customer segments.

-Skincare is understocked despite being the fastest moving.

# • Conclusion & Interpretation:

The analysis achieved its objective by identifying cost-heavy areas (air shipping, certain suppliers), low-profit products, and unnecessary inventory stock. These findings support strategic decisions in supplier evaluation, product mix refinement, and cost-saving initiatives.

# • Recommendations:

* Reevaluate Supplier 4 or consider termination of contract.
* Enhance quality control and establish reliability benchmarks for suppliers.
* Standardize manufacturing processes to reduce lead time variance.
* Monitor and optimize batch sizes to reduce delays.
* Implement demand forecasting for better stock management.
* Use automated inventory alerts for reorder levels.
* Tailor marketing campaigns based on customer gender preferences and purchasing behavior.
* Leverage top-performing product types to attract less engaged segments.
* Limit air shipping unless necessary; consider shifting to sea/rail where feasible.
* Re-evaluate pricing or discontinue unprofitable products.
* Integrate quality checks before production to reduce defect-based losses.