Supply Chain Analysis Project using Power BI

[insert intro\_image]

**Introduction**

This supply chain analysis project is focused on understanding the performance of the supply chain for a fashion and beauty startup. The project uses Power BI to analyze data on the company's suppliers, products, shipping carriers, and customers. The goal of the project is to identify areas where the company can improve its supply chain efficiency, elevate customer satisfaction, reduce operational costs, and maximize profits.

The makeup product supply chain is a complex ecosystem involving various stages, from procurement and manufacturing to distribution and customer delivery. With the help of Power BI, we seek to gain actionable insights that will enable us to make informed decisions, optimize processes, and streamline operations for the benefit of all stakeholders involved.

**Problem Statement**

The makeup product supply chain of our startup faces several challenges that need to be addressed for sustainable growth and profitability. To embark on a journey of data-driven optimization, we must define clear problem statements that serve as focal points for our analysis and improvement efforts. Based on the features available in our supply chain dataset, the following problem statements have been identified:

1. Calculate the total cost, total revenue, and profit generated by the Fashion and Beauty startup based on the given dataset. This information is crucial for assessing the financial health of the business.
2. Determine the number of products sold and the order quantities, which are pivotal metrics for monitoring product demand and stock management.
3. Assess the average lead time for each supplier. This analysis is essential for identifying supplier efficiency and reliability in delivering goods on time.
4. Analyze revenue and shipping costs associated with different shipping carriers to optimize shipping strategies and reduce costs.
5. Explore the number of products sold by product types to identify the most in-demand products and allocate resources accordingly.
6. Investigate defect rates by transportation modes to identify areas where improvements are required in terms of quality control and transportation methods.
7. Calculate the average manufacturing cost, shipping time, and shipping cost by shipping carriers for different product types. This information can aid in cost optimization and logistics management.

By systematically addressing these problem statements, this data analytics project aims to provide valuable insights that can inform strategic decision-making, streamline operations, and ultimately enhance the overall performance of the Fashion and Beauty startup's supply chain.

Power BI Skills / Features Used

DAX – Calculated columns, Measures, Power Query, visualizations

Data Sourcing

The dataset for this data analysis project was downloaded from statso website [link](https://statso.io/supply-chain-analysis-case-study/) . It contains a single csv file. This was uploaded to Power BI desktop for cleaning, analysis and visualization of the data. It contains 100 rows of data and 24 columns.

Data Preparation and Transformation:

* Checked for duplicates and the appropriate datatypes. Checked for any duplicate rows in our dataset using the DAX formula:

**isDuplicate = COUNTROWS(FILTER(supply\_chain\_data, supply\_chain\_data[SKU] = EARLIER(supply\_chain\_data[SKU]))) > 1**

This DAX formula created a new column in the table called **isDuplicate**. The result showed that no duplicate rows was present in the dataset as the isDuplicate column values were all FALSE.

* Some columns such as price, revenue generated, shipping costs, manufacturing costs, defect rates, costs whose numerical values has re-occurring decimals were all rounded off to 2 decimals places for uniformity. This was done in Power BI power query [screenshot of applied steps]
* Created a calculated column ‘Profit’ into the data model using a DAX formula: **Profit = supply\_chain\_data[Revenue generated] – supply\_chain\_data[Costs]**

Data Modelling: The dataset contains just a table hence, no modelling was required for the data analysis.

Data Analysis and Visualization

[insert the power BI report page]

Key Findings

* The overall financial performance of the fashion and beauty startup is strong, with a profit of $524.68K.
* Skincare products are the most in-demand, with 44.97% of total products sold.
* Road transportation has the highest defect rate (76.03%) while Sea transportation has the lowest defect rate at 17.25%.
* Carrier B is the top revenue generator, contributing $250.09K and offers the fastest average shipping time (5.30 days) and competitive shipping costs.
* Supplier 1 has the shortest average lead time (14.78 days), making them the most efficient supplier.
* Supplier 3 has the longest average lead time (20.13 days), indicating room for improvement in terms of lead time for raw materials delivery.

Recommendations

* The business should consider optimizing supplier relationships and agreements to further reduce lead times, especially with Supplier 3.
* The company should implement quality control measures and investigate ways to improve the packaging of products to reduce the defect rate for road transportation.
* The company should consider expanding its supplier base to reduce its reliance on a few suppliers.
* Explore ways to improve manufacturing efficiency for skincare and haircare products.

Conclusion

This data analysis project provides valuable insights into the fashion and beauty startup's supply chain. The startup is currently profitable, with strong demand for skincare products. However, there are opportunities to further enhance efficiency, reduce defects, and optimize manufacturing and shipping processes.

By implementing the recommendations above, the company can reduce costs, improve customer service, and increase profits.

Reference

* Aman Kharwal. (2023, April 3). Supply Chain Analysis Using Python. Retrieved from https://thecleverprogrammer.com/2023/04/03/supply-chain-analysis-using-python/
* Superprocure. (2023, October 3). Impact of big data on supply chain management. Retrieved from https://www.superprocure.com/blog/impact-of-big-data-on-supply-chain-management/