Supply Chain Analysis Documentation

Introduction

The supply chain refers to the interconnected system of manufacturing and transportation that is responsible for creating and distributing goods to customers. Supply chain analysis involves examining different parts of the supply chain to identify opportunities for enhancing its efficiency and generating greater value for customers. If you are interested in learning how to conduct supply chain analysis, this article is specifically designed to guide you through the process using Python.

Data Summary

The provided data includes the following columns:

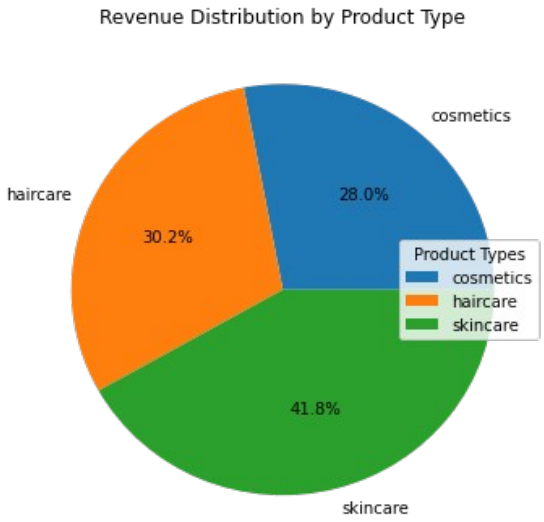
Product Type: The category or type of the product.
SKU (Stock Keeping Unit): A unique identifier for each product.
Price: The price of each product.
Availability: The current stock availability of each product.
Number of Products Sold: The total number of units sold for each product.
Revenue Generated: The total revenue generated from sales of each product.
Customer Demographics: Information about the customer demographics associated with each product.
Stock Levels: The current stock levels of each product.
Lead Times: The lead time for replenishing the stock of each product.
Order Quantities: The typical quantity ordered when restocking each product.
Shipping Times: The time it takes to ship each product to customers.
Shipping Carriers: The carrier responsible for shipping each product.
Shipping Costs: The cost associated with shipping each product.
Supplier Name: The name of the supplier providing each product.
Location: The location of the supplier.
Lead Time (Supplier): The lead time for receiving each product from the supplier.
Production Volumes: The volume of production or manufacturing for each product.
Manufacturing Lead Time: The time it takes to manufacture each product.
Manufacturing Costs: The cost associated with manufacturing each product.
Inspection Results: The status of product inspection for each product.
Defect Rates: The defect rate for each product.
Transportation Modes: The modes of transportation used for each product.
Routes: The specific routes for transportation of each product.
Costs: The transportation costs associated with each route.

Question 1: What is the average price of makeup products?

The average price of makeup products is 49.46. This means that, on average, makeup products in the dataset have a price close to $49.46.

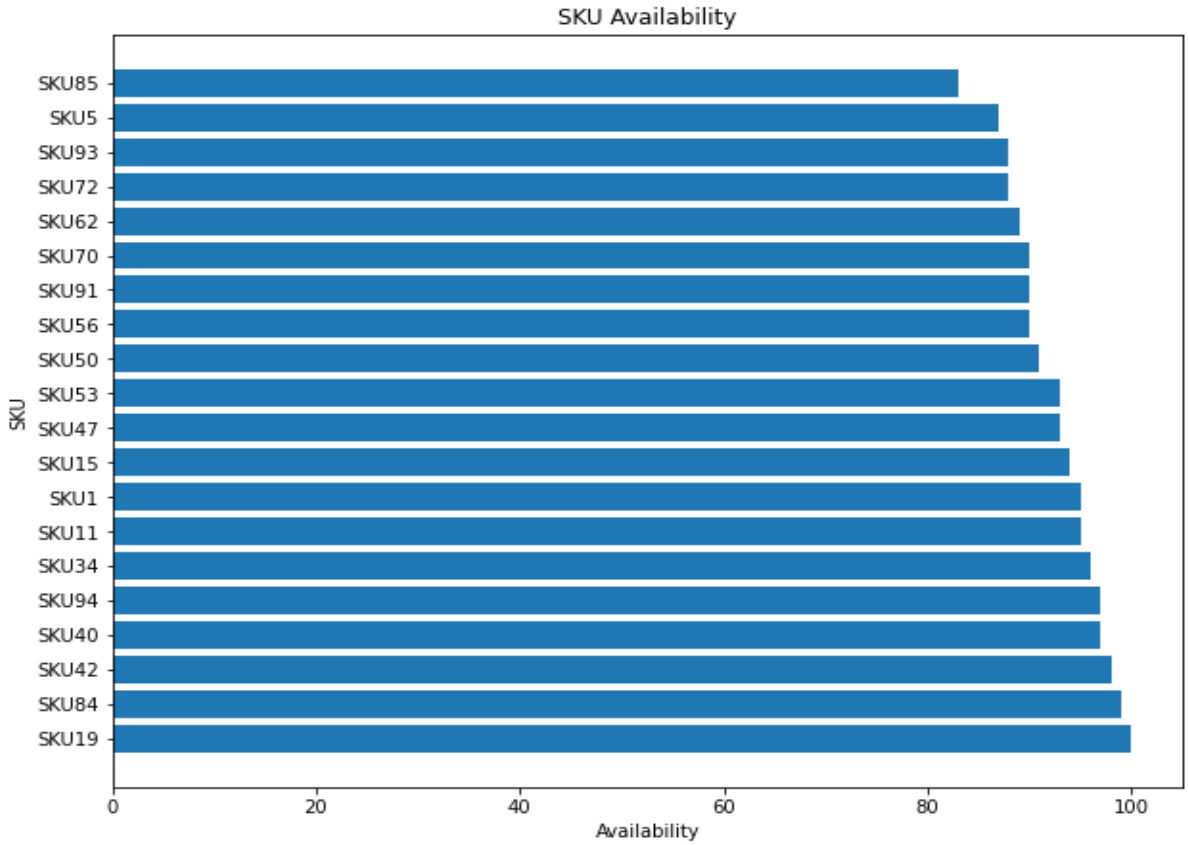
Question 2: Which product type has the highest revenue generated?

Among the different product types, skincare has generated the highest revenue, with a total revenue of 241,628.16. This indicates that skincare products have been more profitable compared to cosmetics and haircare products in the dataset.



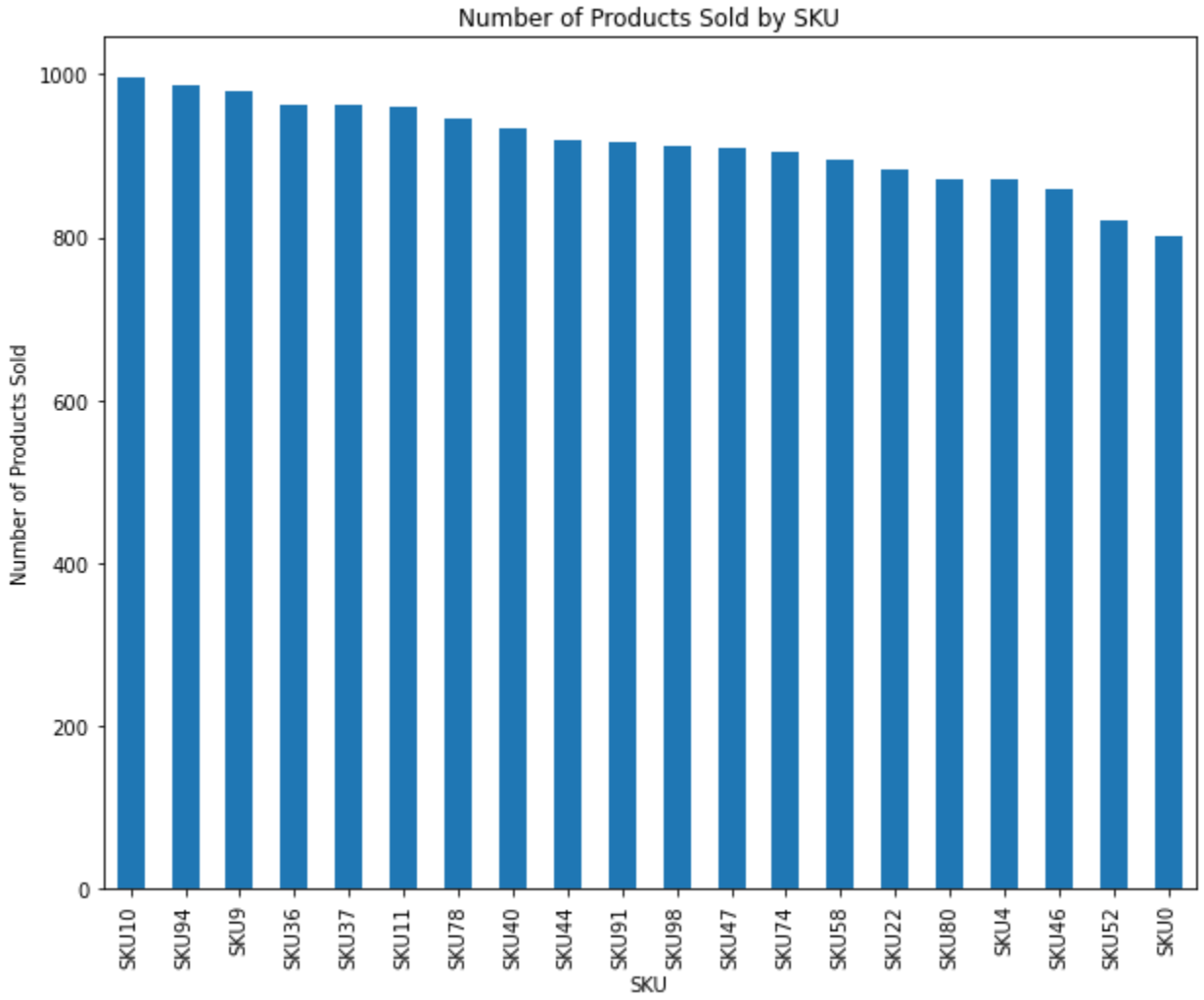
Question 3: What is the availability status of top products?

The top products listed have high availability status, ranging from 100 to 83. SKU19 has the highest availability of 100, followed by SKU84 with 99 and SKU42 with 98. These products are consistently available, indicating a good supply and stock management for these items. It is important for customers to know that these top products are readily accessible and likely to be in stock when they want to make a purchase.



Question 4: How many products have been sold for each SKU?

The number of products sold for each SKU varies, with SKU10 having the highest number of units sold at 996, followed by SKU94 with 987 and SKU9 with 980. The sales quantities for each SKU gradually decrease from SKU10 to SKU0, indicating varying levels of demand for these products. It is important to monitor the sales performance of each SKU to identify popular and less popular items in order to optimize inventory management and meet customer demand effectively.

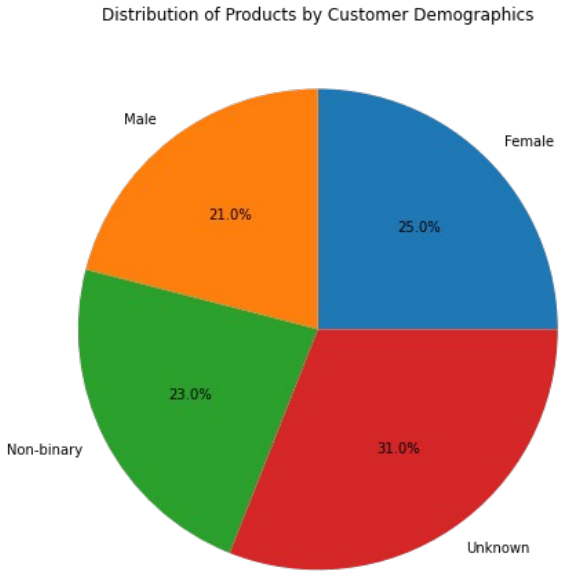


Question 5: Which customer demographics are most interested in makeup products?

The customer demographics most interested in makeup products are as follows:

Female: 25 customers
Male: 21 customers
Non-binary: 23 customers
Unknown: 31 customers

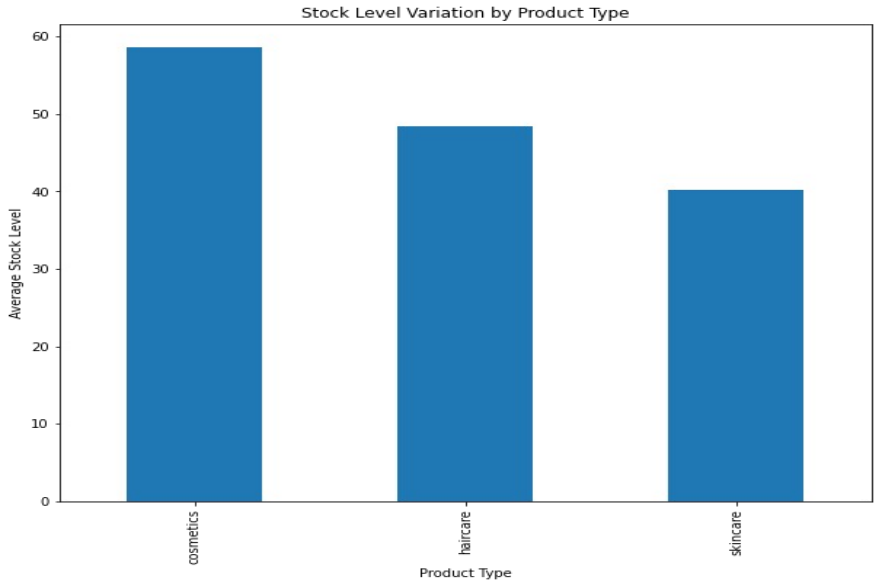
These numbers suggest that makeup products have a broad appeal across different customer demographics. It indicates that individuals identifying as female, male, non-binary, or unknown have shown interest in purchasing makeup products. This information is valuable for understanding the target audience and tailoring marketing strategies to effectively reach and engage these customer segments.



Question 6: How does the stock level vary for different product types?

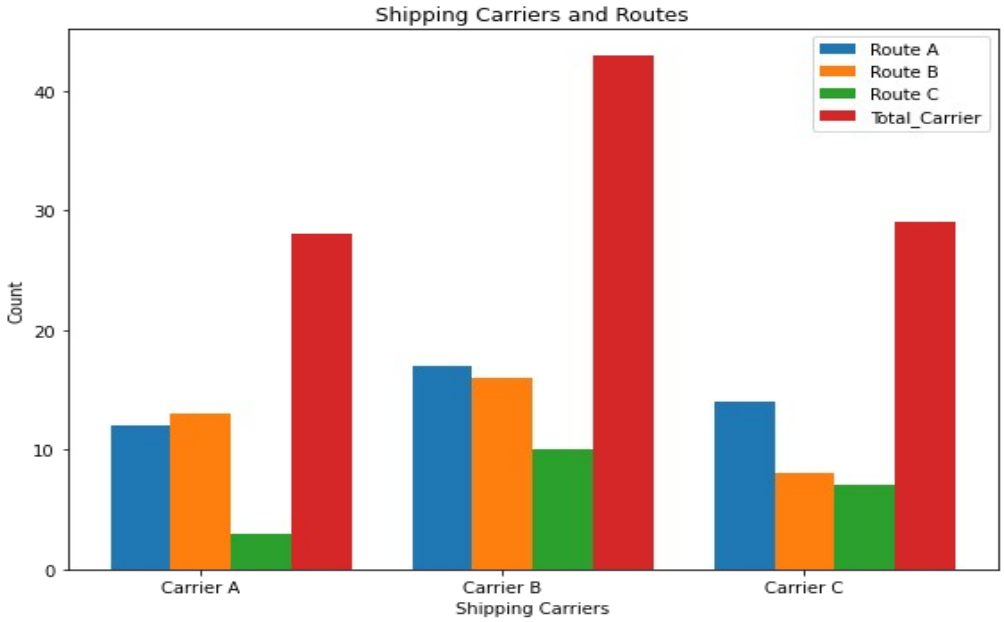
The stock level varies for different product types as follows:

Cosmetics: The average stock level for cosmetics is 58.65 units. This suggests that, on average, there is a relatively higher stock availability for cosmetic products.
Haircare: The average stock level for haircare products is 48.35 units. Haircare products have a slightly lower average stock level compared to cosmetics.
Skincare: The average stock level for skincare products is 40.20 units. Skincare products have the lowest average stock level among the three product types.



Question 7: What is the number of each of the routes that each shipping carriers use?

The results show the number of routes used by each shipping carrier:
Carrier A: This carrier uses 12 shipments on Route A, 13 shipments on Route B, and 3 shipments on Route C. The total number of shipments made by Carrier A is 28.
Carrier B: This carrier uses 17 shipments on Route A, 16 shipments on Route B, and 10 shipments on Route C. The total number of shipments made by Carrier B is 43.
Carrier C: This carrier uses 14 shipments on Route A, 8 shipments on Route B, and 7 shipments on Route C. The total number of shipments made by Carrier C is 29.

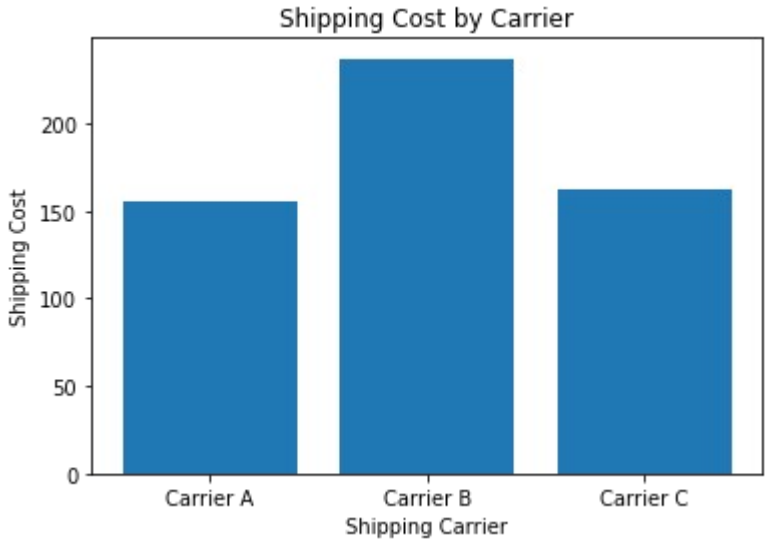


Question 8: What is the shipping cost for each of the shipping carriers?

The results show the shipping costs for each of the shipping carriers:

Carrier A: The shipping cost for Carrier A is 155.537831.
Carrier B: The shipping cost for Carrier B is 236.897620.
Carrier C: The shipping cost for Carrier C is 162.379457.

These values represent the average shipping cost incurred by each shipping carrier. It indicates the monetary expense associated with shipping products for each carrier. Analyzing shipping costs can help evaluate the efficiency and cost-effectiveness of different carriers, enabling businesses to make informed decisions regarding shipping methods and carrier selection.

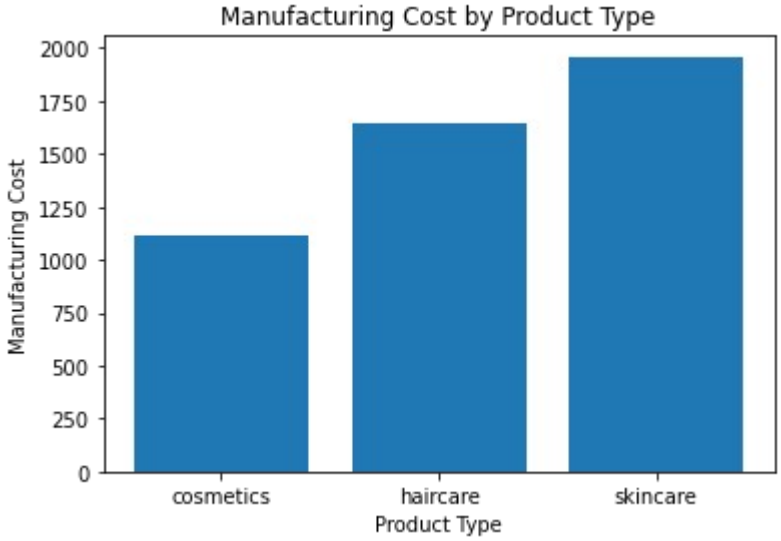


Question 9: What is the manufacturing cost for each of the product types?

The results show the manufacturing costs for each of the product types:

Cosmetics: The manufacturing cost for cosmetics is 1119.371253.
Haircare: The manufacturing cost for haircare products is 1647.571776.
Skincare: The manufacturing cost for skincare products is 1959.726295.

These values represent the average manufacturing costs incurred for each product type. It indicates the expenses associated with producing and manufacturing products in each category. Analyzing manufacturing costs can help businesses assess the cost structure of different product types and make informed decisions about pricing, profitability, and resource allocation.

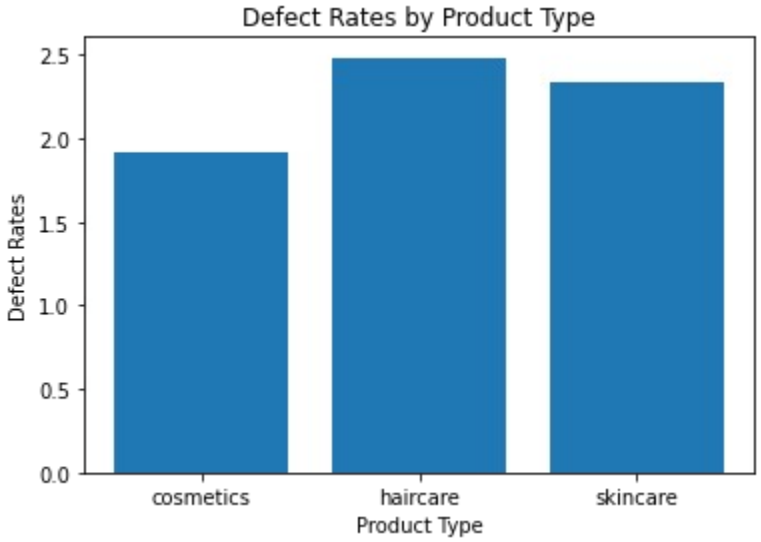


Question 10a: Which product type has more defects?

The results indicate the average number of defects for each product type:

Cosmetics: The average number of defects for cosmetics is 1.919287.
Haircare: The average number of defects for haircare products is 2.483150.
Skincare: The average number of defects for skincare products is 2.334681.

These values represent the average defect rates observed for each product type. A higher average defect rate suggests a higher likelihood of products in that category having defects or quality issues. Monitoring and addressing product defects is crucial for maintaining customer satisfaction and product quality. By identifying the product type with a higher average defect rate, businesses can focus on improving quality control processes, addressing potential issues, and minimizing defects in the future.

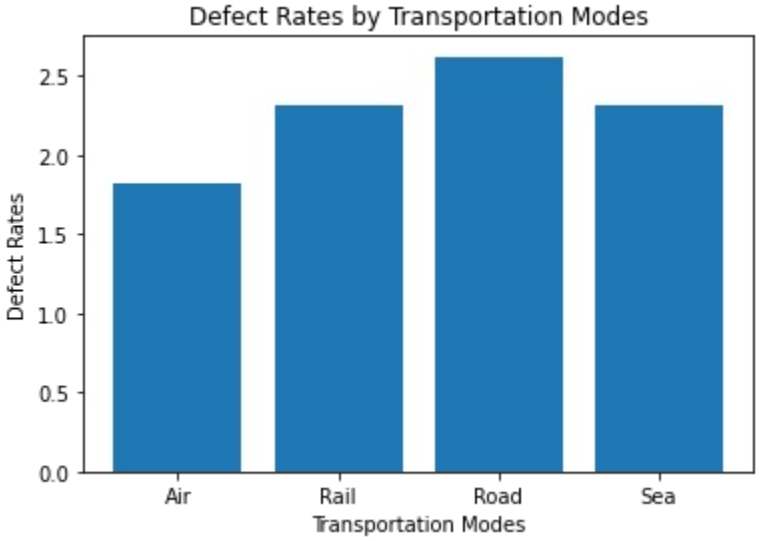


Question 10b: Which transportation mode causes more defects?

The results indicate the average number of defects for each transportation mode:

Air: The average number of defects caused during air transportation is 1.823924.
Rail: The average number of defects caused during rail transportation is 2.318814.
Road: The average number of defects caused during road transportation is 2.620938.
Sea: The average number of defects caused during sea transportation is 2.315281.

These values represent the average defect rates observed for each transportation mode. A higher average defect rate suggests a higher likelihood of defects occurring during transportation via that mode. It is important for businesses to identify the transportation mode with a higher average defect rate to evaluate and improve their logistics and handling processes. Implementing better packaging, secure loading/unloading procedures, and monitoring environmental conditions during transportation can help minimize the risk of defects and ensure the safe delivery of products to customers.



Conclusion

In conclusion, this supply chain analysis provides valuable insights into the performance and dynamics of a diverse range of products within the supply chain.
The average price of makeup products in the dataset is approximately $49.46, providing a benchmark for pricing strategies within this product category.
Among the product types, skincare products stand out as the highest revenue generator, with total revenue reaching $241,628.16.
Several top-performing products maintain high availability levels, ensuring that customers have access to these items when they wish to make a purchase. Effective supply and stock management are evident for these products.
The analysis reveals variations in the number of units sold for each product SKU, highlighting the importance of monitoring sales to optimize inventory management and meet customer demand effectively.
Makeup products appeal to a broad range of customer demographics, including females, males, non-binary individuals, and those with unknown demographics. This

information is valuable for crafting targeted marketing strategies.
Stock levels differ among product types, with cosmetics having the highest average stock levels, followed by haircare and skincare products.
The analysis provides insights into the number of shipments and shipping costs associated with different carriers. This information can aid in carrier selection and cost-effective shipping decisions.
Understanding manufacturing costs for each product type can inform pricing strategies and resource allocation.
Identifying the product type with higher defect rates is critical for quality control and customer satisfaction. Addressing quality issues can enhance product reliability and reputation.
Analyzing defect rates associated with different transportation modes helps in evaluating and improving logistics processes to reduce the risk of defects during transportation.
Incorporating these insights into supply chain management can lead to more informed decision-making, improved customer service, cost reduction, and increased competitiveness in the marketplace.