Supply Chain Analysis

- AMC LLC, a fashion and beauty company

Background

AMC LLC, a fashion and beauty company facing declining sales over the past three years. To address this challenge, the company aims to conduct a supply chain analysis. By optimizing sales and reducing costs through this analysis, AMC LLC seeks to revitalize its business and ensure long-term success.

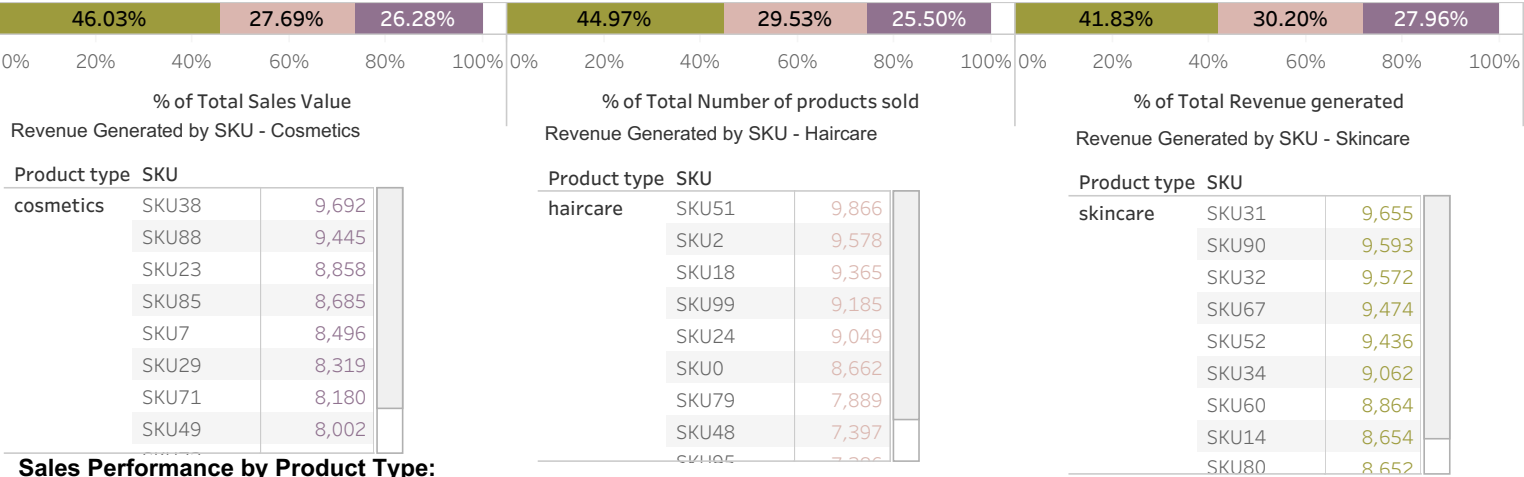## Criteria for success

Maximizing Sales
- Increase sales of products & product types that drive the most revenue
- Focus on customer needs
- Reduce product lead time

Reducing Costs
- Reduce defect rate
- Find effective shipping mode
- Find effective carrier

Sales Optimization

Sales Value, Sales QTY and Revenue by Product Type

46.03%	27.69%	26.28%

0% 20% 40% 60% 80% 100%

% of Total Sales Value

44.97%	29.53%	25.50%

0% 20% 40% 60% 80% 100%

% of Total Number of products sold

41.83%	30.20%	27.96%

0% 20% 40% 60% 80% 100%

% of Total Revenue generated

Revenue Generated by SKU - Cosmetics

Product type	SKU	
cosmetics	SKU38	9,692
	SKU88	9,445
	SKU23	8,858
	SKU85	8,685
	SKU7	8,496
	SKU29	8,319
	SKU71	8,180
	SKU49	8,002

Revenue Generated by SKU - Haircare

Product type	SKU	
haircare	SKU51	9,866
	SKU2	9,578
	SKU18	9,365
	SKU99	9,185
	SKU24	9,049
	SKU0	8,662
	SKU79	7,889
	SKU48	7,397
	SKU95	

Revenue Generated by SKU - Skincare

Product type	SKU	
skincare	SKU31	9,655
	SKU90	9,593
	SKU32	9,572
	SKU67	9,474
	SKU52	9,436
	SKU34	9,062
	SKU60	8,864
	SKU14	8,654
	SKU80	8,652

Sales Performance by Product Type:

From the sales value, sales QTY, and revenue by product type, we can see that Skin care type dominates, constituting 46% of sales value, 44% of sales quantity, and 41% of total revenue generated. We can continue to prioritize sales efforts for this product type by encourage repeat purchases through customer loyalty programs and continuously innovate skincare product offerings to stay competitive in the market.

Revenue by SKU:

Looking at the revenue generated by SKU, we can focus on increasing sales for the top 5 to 10 items within Skincare, Haircare, and Cosmetics categories, as these already contribute significantly to overall sales

- Skincare : SKU 31, 90, 32, 67,52
- Haircare : SKU 51, 2,18,99
- Cosmetics : SKU 38, 88, 23, 85, 7

Sales Optimization

Revenue Generated by location

Location

Customer demographics
- Female
- Male
- Non-binary
- Unknown
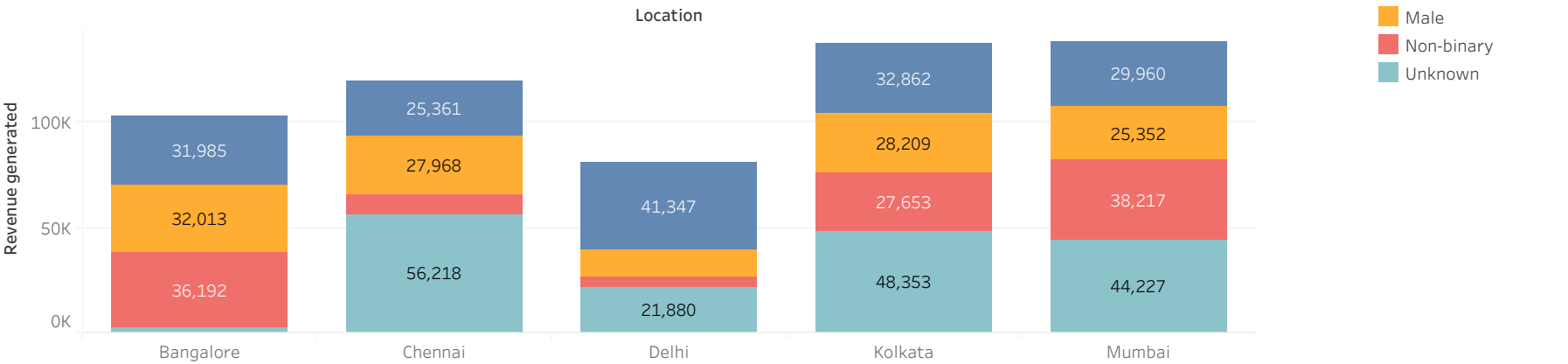
Revenue Generated by Customer Demographics

Customer d..	
Female	27.963%
Male	21.924%
Non-binary	20.146%
Unknown	29.967%

Geographic Revenue Distribution:
Looking at the revenue generated geographically, Mumbai and Kolkata emerge as the primary locations generating the highest revenue. These locations represent our target markets that required focused attention

Customer Demographics :
Contrary to the assumption that females drive most purchases in beauty and fashion industry, customer demographics reveal that males also contribute 21% of revenue, compared to 27% generated by females.

Additionally, customers with "unknown" demographics account for the highest perc..

Supplier and Production Efficiency
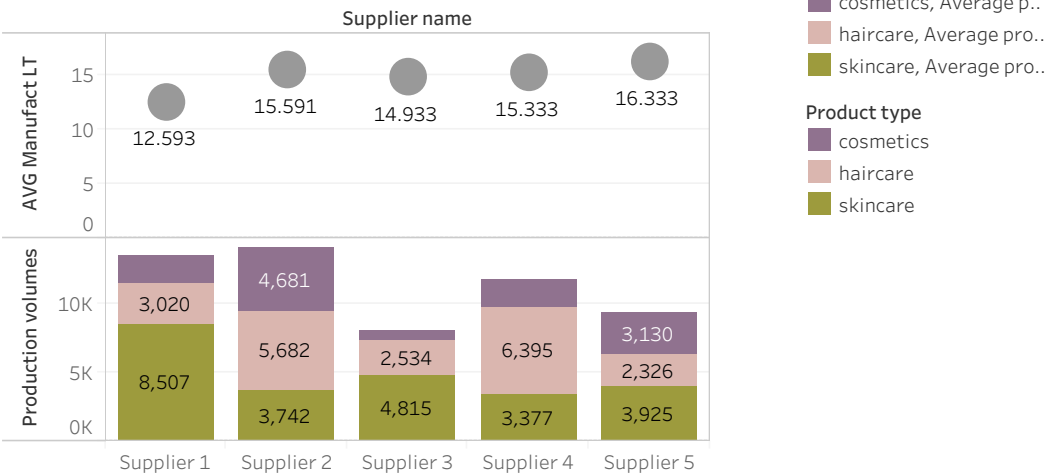
Average LT & Stock Level by Product Type

Product type

1,644	1,608	1,525

haircare, skincare, cosmetics

Average product Lead time: 15, 10, 5, 0
Stock levels: 1500, 1000, 500, 0

Manufacturing LT & Production Volumes by Supplier

Supplier name

AVG Manufact LT: 15, 10, 5, 0

12.593	15.591	14.933	15.333	16.333

Production volumes: 10K, 5K, 0K

Supplier 1	Supplier 2	Supplier 3	Supplier 4	Supplier 5
3,020	4,681			3,130
8,507	5,682	2,534	6,395	2,326
	3,742	4,815	3,377	3,925

Production Lead Time Analysis:
Shorter production lead times are crucial for business growth. Although cosmetics have the lowest sales among the three product types, their average lead time of 13 days is the shortest. Given this, maintaining high stock levels for cosmetics may not be necessary. The company can reduce stock levels for cosmetics to optimize warehouse space and ensure sufficient inventory for other product types to meet customer demand.
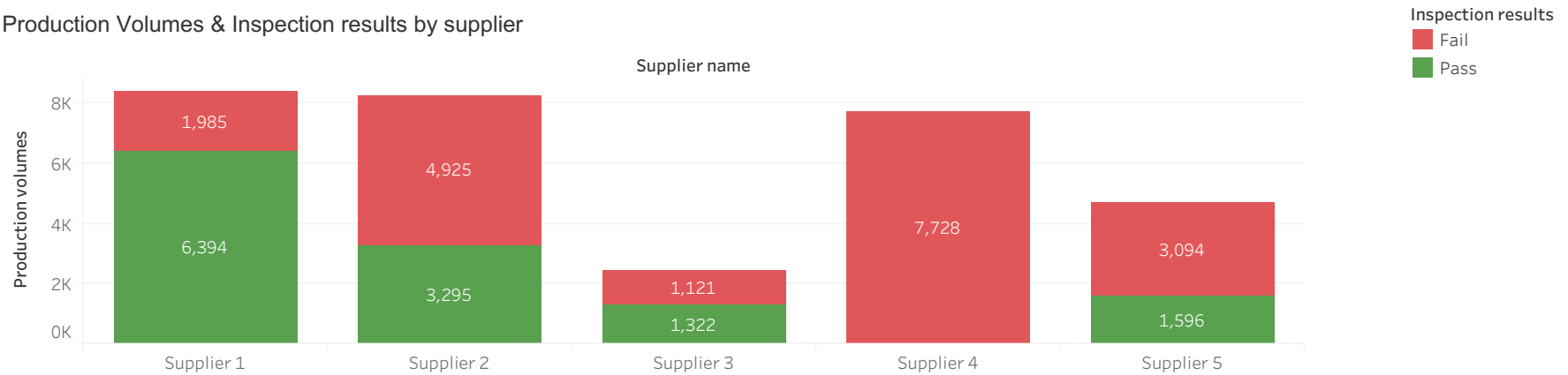
Supplier Analysis:
Examining manufacturing lead time and production volumes by supplier, Supplier 1 stands out with an average lead time of 12 days and a production volume of 13K. In contrast, suppliers 3 and 5 have longer production lead times. The company may consider allocating more orders to Supplier 1 and Supplier 2 to reduce overall product lead time.

Supplier and Production Efficiency

Production Volumes & Inspection results by supplier

Supplier name

Production volumes (y-axis)

Supplier 1	Supplier 2	Supplier 3	Supplier 4	Supplier 5
1,985 (Fail)	4,925 (Fail)	1,121 (Fail)	7,728 (Fail)	3,094 (Fail)
6,394 (Pass)	3,295 (Pass)	1,322 (Pass)		1,596 (Pass)

Avg Defect Rate by Supplier

Supplier na..	
Supplier 5	2.6654
Supplier 3	2.4658
Supplier 2	2.3628
Supplier 4	2.3374
Supplier 1	1.8036

We can consider defect rates by supplier and transportation mode. Currently, we'll focus on the defect rate and inspection results by supplier.

Supplier 1 shows the lowest defect rate at 1.8% and the highest pass production volume at 6K units, indicating superior performance compared to other suppliers. However, Supplier 4 shares a similar defect rate with Supplier 2, but with zero successful pass cases, suggesting poor quality control. It may be advisable to reallocate more orders to Supplier 1 for improved product quality and reduce overall production defect rate.

Transportation Mode Selection

AVG shipping cost & time by Transportation modes
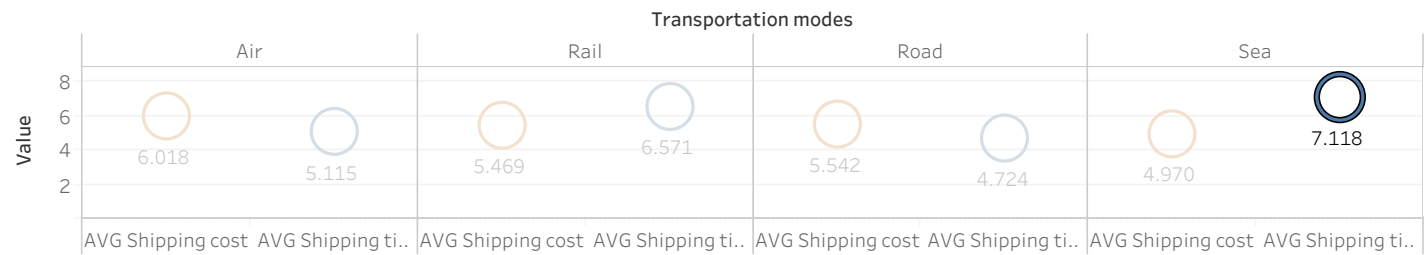
Transportation modes

	Air		Rail		Road		Sea	
Value	6.018	5.115	5.469	6.571	5.542	4.724	4.970	7.118
	AVG Shipping cost	AVG Shipping ti..	AVG Shipping cost	AVG Shipping ti..	AVG Shipping cost	AVG Shipping ti..	AVG Shipping cost	AVG Shipping ti..

Shipping cost by Transportation Modes

Pie chart values: 14,605 / 15,169 / 16,048 / 7,103
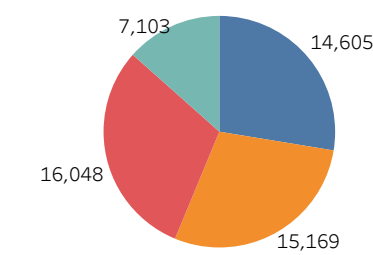
Defect rate by Transportation modes

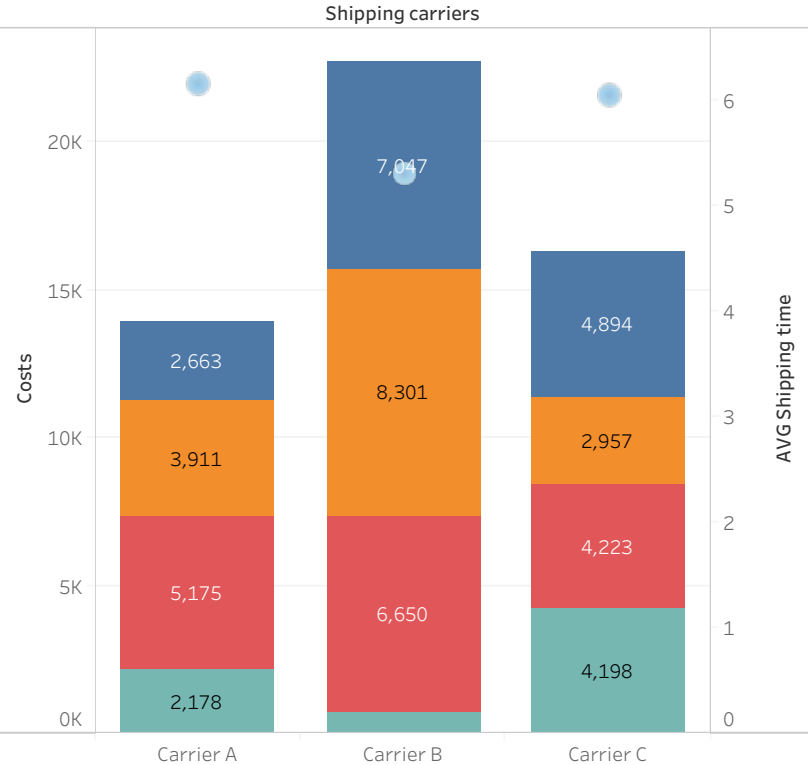| Transporta..	
Air	20.83%
Rail	28.51%
Road	33.38%
Sea	17.28%

Shipping Cost by Transportation Modes Chart:
The company spends the most on shipping costs via road, totaling 16K, followed by rail at 15K, air at 14K, and sea at 7K

Defect Rate by Transportation Mode Chart
Road transportation mode has the highest defect rate, indicating a higher risk of product damage, followed by rail, air, and sea, which is the most secure option.

Optimal Transportation Mode Analysis:
Considering both cost and security, sea transportation emerges as the most favorable option. It boasts the lowest average shipping cost and is the most secure method. If lead time allows and the order quantity is large, choosing sea transportation is optimal. Rail transportation offers similar shipping costs t..

Transportation Mode Selection

Avg Shipping cost & Time by Carrier

Shipping carriers

Based on previous analysis, we recommend utilizing sea and rail transportation modes when lead time allows. Now, let's examine the average shipping cost by carrier. Carrier A and Carrier B have similar shipping lead times at 6.14 vs. 6.03 days, respectively. However, Carrier A achieves the current goal and status with a lower cost of $2663 for air transportation, compared to Carrier C at $4894. Therefore, allocating more suitable orders to be shipped via rail and sea with Carrier A can lead to significant cost savings while meeting the current delivery date and lead time

Conclusion

Sales Performance and Customer Demographics:
- Skincare products drive the highest revenue, with Mumbai and Kolkata as key markets.
- Male customers contribute significantly to revenue alongside female customers.
- Recording customer demographics, including gender, is essential for tailored marketing strategies.

Production Lead Time and Supplier Performance:
- Cosmetics exhibit the shortest lead time despite lower sales volume.
- Supplier 1 demonstrates superior performance with the lowest defect rate and highest pass production volume.

Transportation Mode Selection and Cost Optimization:
- Road transportation incurs the highest shipping costs and defect rates.
- Sea transportation offers the lowest costs and highest security.
- Carrier A is cost-effective with similar lead times compared to Carrier B but lower air transportation expenses compared to Carrier C.

Executive Summary & Insights

- To maximize sales and profitability, prioritize skincare products in target markets.
- Optimize production processes by selecting supplier 1 with shorter lead times and superior quality control
- Choose cost-effective transportation modes like sea and rail and leverage carriers with competitive pricing and reliable delivery performance.
- Leverage carriers like Carrier A, which offer competitive pricing and reliable delivery performance.