

SUPPLY CHAIN & LOGISTICS ANALYTICS

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PROBLEM STATEMENT & OVERVIEW



Problem Statement

The organization lacked a unified view of revenue, logistics costs, inventory levels, production performance, lead times, and defect rates.

Decision-makers had to rely on manual reports and raw spreadsheets, which made it difficult to:

- Identify inefficiencies
- Monitor product performance
- Track quality issues
- Optimize logistics and production
- Improve manufacturing and delivery speed

↗ Project Overview

This Power BI dashboard provides a centralized, interactive analytics system covering:

- Executive supply chain metrics
- Inventory and production performance
- Lead time & efficiency analysis
- Quality & defect monitoring

It gives management a data-driven approach to improve operational performance.

WHO WILL USE THIS DASHBOARD

Primary Users

1. Supply Chain Managers

To monitor logistics, lead times, and cost efficiency.

2. Inventory Managers / Warehouse Supervisors

To track stock levels, availability, and SKU performance.

3. Production / Manufacturing Teams

To optimize manufacturing lead times and production volumes.

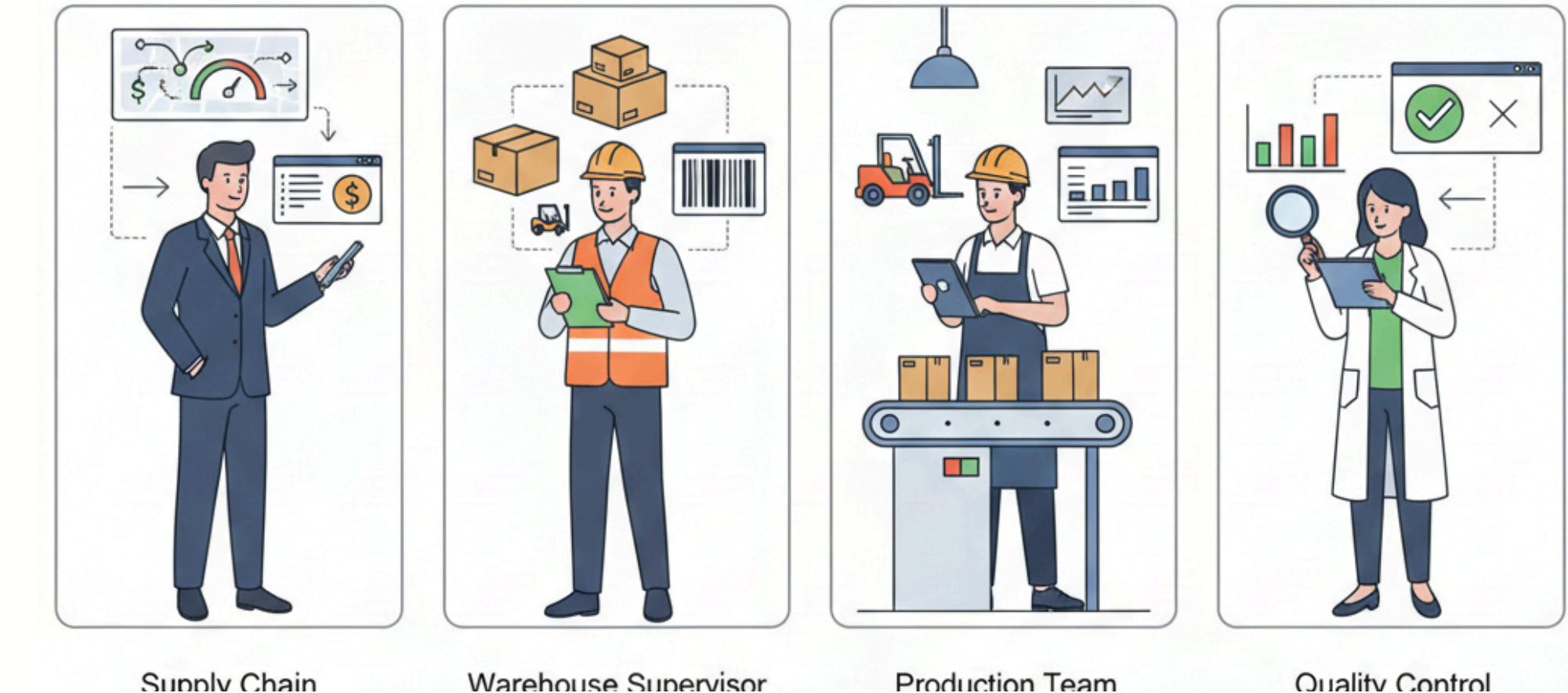
4. Quality Control Teams

To analyze defect rates and inspection results.



Business Value

- Faster decision-making
- Reduced stockouts & overstock
- Optimized manufacturing cycles
- Improved product quality
- Cost reduction opportunities





DATA OVERVIEW

📌 Key Columns Used in the Project

Product Details

- Product type
- SKU
- Price
- Customer demographics

Sales & Revenue

- Number of products sold
- Revenue generated

Inventory & Demand

- Availability
- Stock levels
- Order quantities

Production

- Production volumes
- Manufacturing lead time
- Manufacturing costs

Logistics & Shipping

- Lead times
- Shipping times
- Shipping carriers
- Shipping costs
- Transportation modes
- Routes

Quality

- Inspection results
- Defect rates

Other

- Supplier name
- Location
- Costs

📌 Key Fields Used

- Revenue, Units Sold, Logistics Cost
- Product Type, SKU, Location
- Stock Levels, Order Quantities
- Manufacturing & Delivery Lead Times
- Production Volumes
- Defect Rate, Inspection Results

📌 Data Cleaning Performed

- Standardized categorical values
- Removed duplicates
- Checked missing values (esp. demographic fields)
- Created DAX measures for KPIs
- Applied Top N filtering for SKU visuals

DASHBOARD DESIGN

📌 **KPI Cards**: Total Revenue, Total Units Sold, Total Logistics Cost, Average Lead Time, Average Manufacturing Lead Time, Average Defect Rate, Total Stock, Avg Stock Level, Total Production Volume, Avg Manufacturing Cost, Availability %, Total Passed Products, Total Failed Products, Defect Cost

📌 Executive Overview Page (Page 1)

Bar Chart:

- Total Revenue by Product Type
- Total Units Sold by SKU (Top N)

Clustered Column Chart:

- Revenue by Location

Doughnut Chart:

- Total Logistics Cost by Transportation Modes

📌 Lead Time & Efficiency Page (Page 3)

Area Chart:

- Avg Manufacturing Lead Time by Product Type

Line Chart:

- Avg Lead Time by Product Type

Scatter Plot:

- Manufacturing Lead Time vs Total Lead Time

Pie Chart (or Donut):

- Lead Time Distribution by Product Type

📌 Inventory & Operations Page (Page 2)

Column Chart:

- Stock Level by Product Type

Bar Chart:

- Top 6 SKUs by Production Volume

Scatter Plot:

- Availability vs Order Quantities

Treemap:

- SKU Distribution by Product Type

📌 Quality & Defect Analysis Page (Page 4)

Bar Chart:

- Average Defect Rate by SKU

Doughnut Chart:

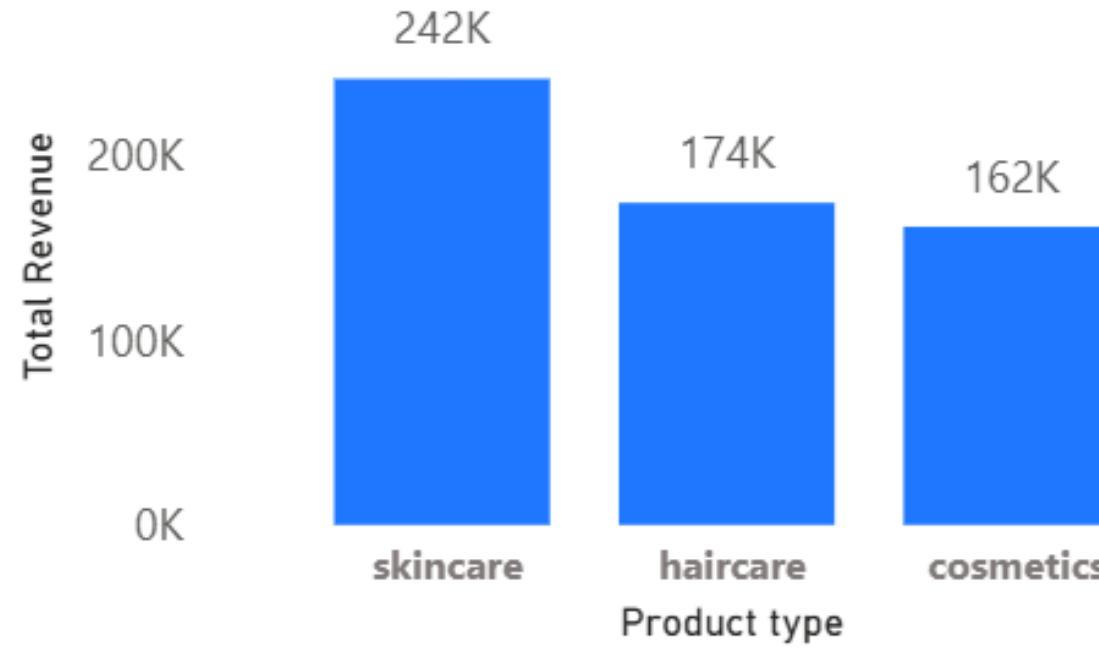
- Pass vs Fail Percentage

Scatter Plot:

- Production Volume vs Defect Rates by Product Type

KEY INSIGHTS - EXECUTIVE OVERVIEW

Total Revenue by Product type



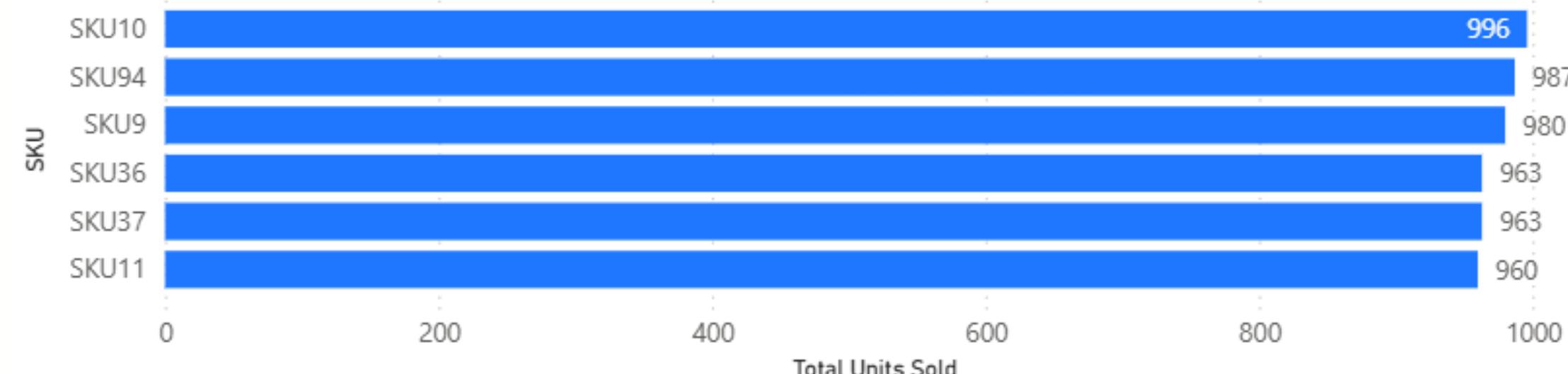
Total Revenue by Product Type

- Skincare generates the highest revenue at 242K, contributing the most to overall sales.
- Haircare and Cosmetics lag behind with 174K and 162K, indicating lower market demand.
- Revenue concentration suggests Skincare is the primary driver of business growth.

📌 Total Units Sold by SKU

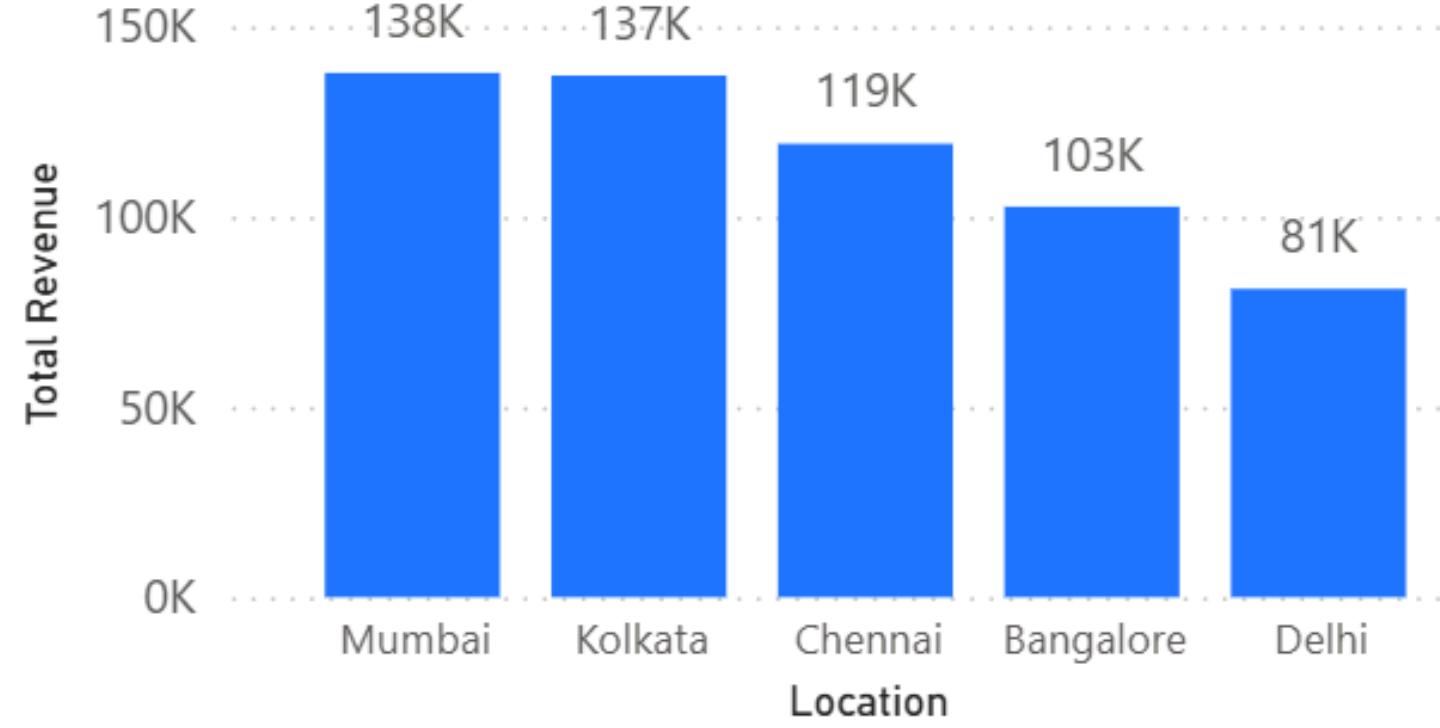
- SKU10, SKU94, and SKU9 are the top 3 selling SKUs, all above 980 units.
- High-selling SKUs align with high-revenue categories, confirming strong product-market fit.
- Sales distribution shows dependency on a few top performers.

Total Units Sold by SKU



KEY INSIGHTS - EXECUTIVE OVERVIEW

Total Revenue by Location



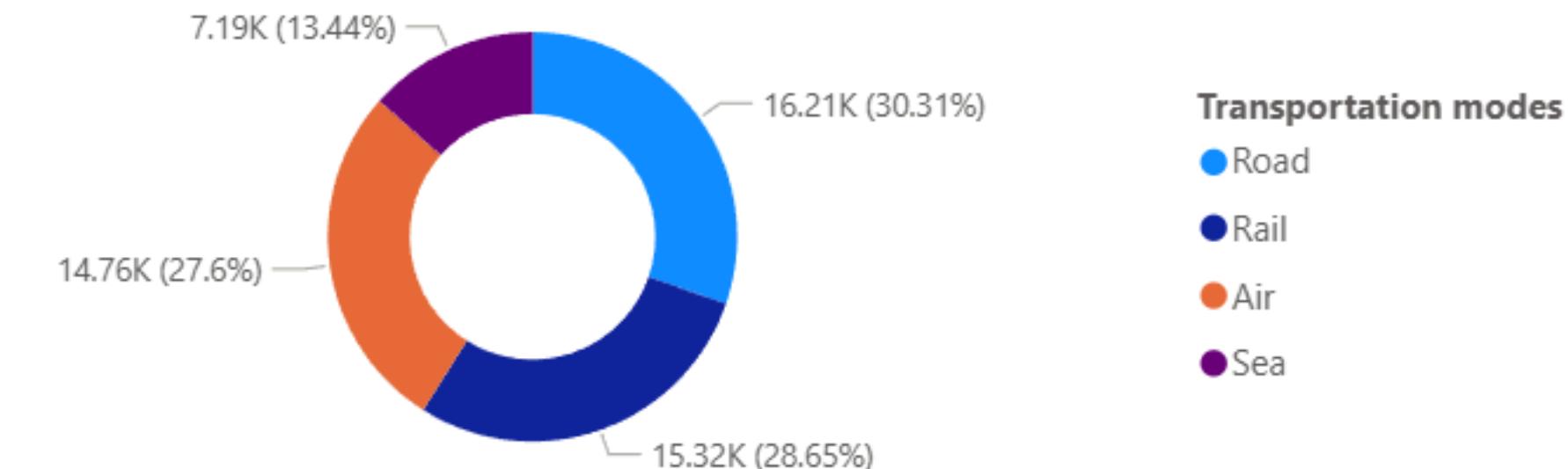
Total Revenue by Location – Insights

- Mumbai (138K) & Kolkata (137K) generate the highest revenue, making them the strongest markets.
- Chennai (119K) shows moderate performance with stable demand.
- Bangalore (103K) and Delhi (81K) lag significantly behind the top cities.
- Overall Insight: Revenue concentration is mainly driven by Mumbai and Kolkata, indicating these two locations hold the strongest commercial potential.

Logistics Cost by Transportation Mode – Insights

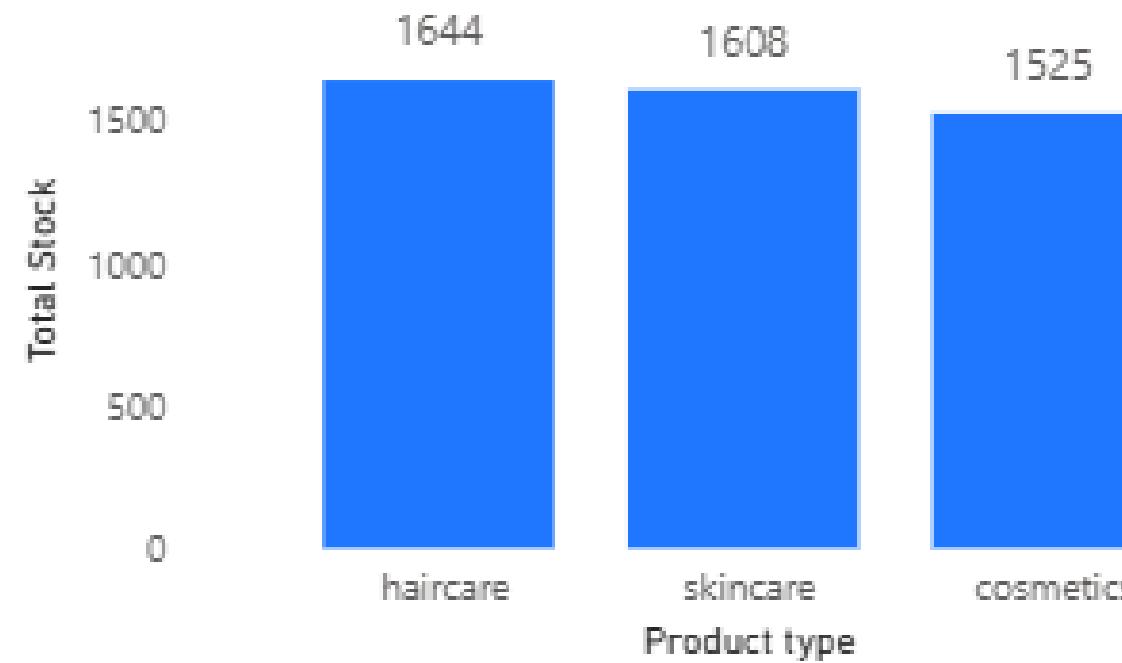
- Road transport has the highest cost share (30.31%)
- Rail follows closely at 28.65%
- Air contributes 27.6% – expensive but used heavily
- Sea has the lowest logistics cost (13.44%)
- Logistics cost pattern shows reliance on faster but costlier transport modes

Total Logistics Cost by Transportation modes



KEY INSIGHTS - Inventory & Operations Overview

Stock Level by Product Type



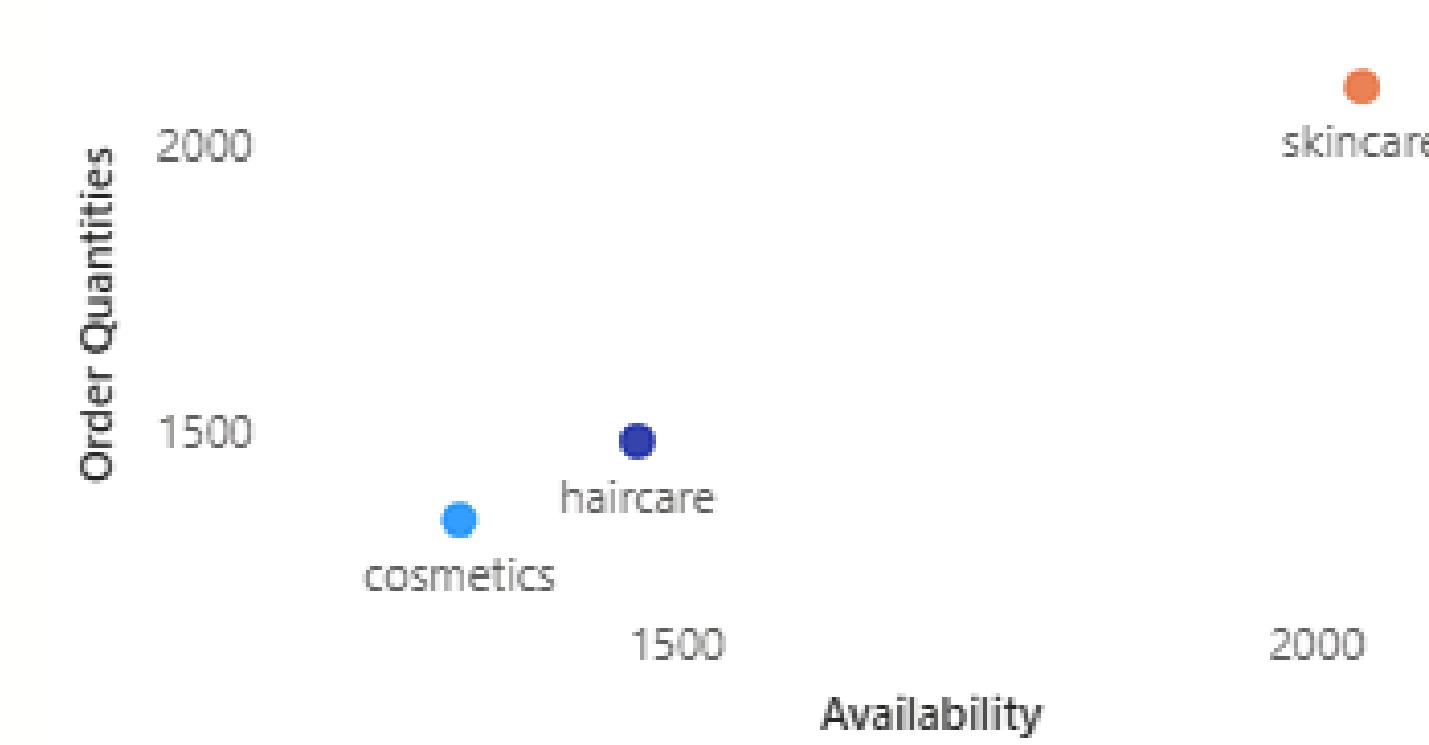
Stock Level by Product Type – Insights

- Haircare has the highest stock level (1644 units), indicating strong production or slower movement.
- Skincare holds 1608 units, showing a balanced inventory level aligned with demand.
- Cosmetics has the lowest stock (1525 units) but still maintains a healthy volume.
- Overall Insight: Inventory levels across all three categories are balanced, with Haircare leading in available stock.

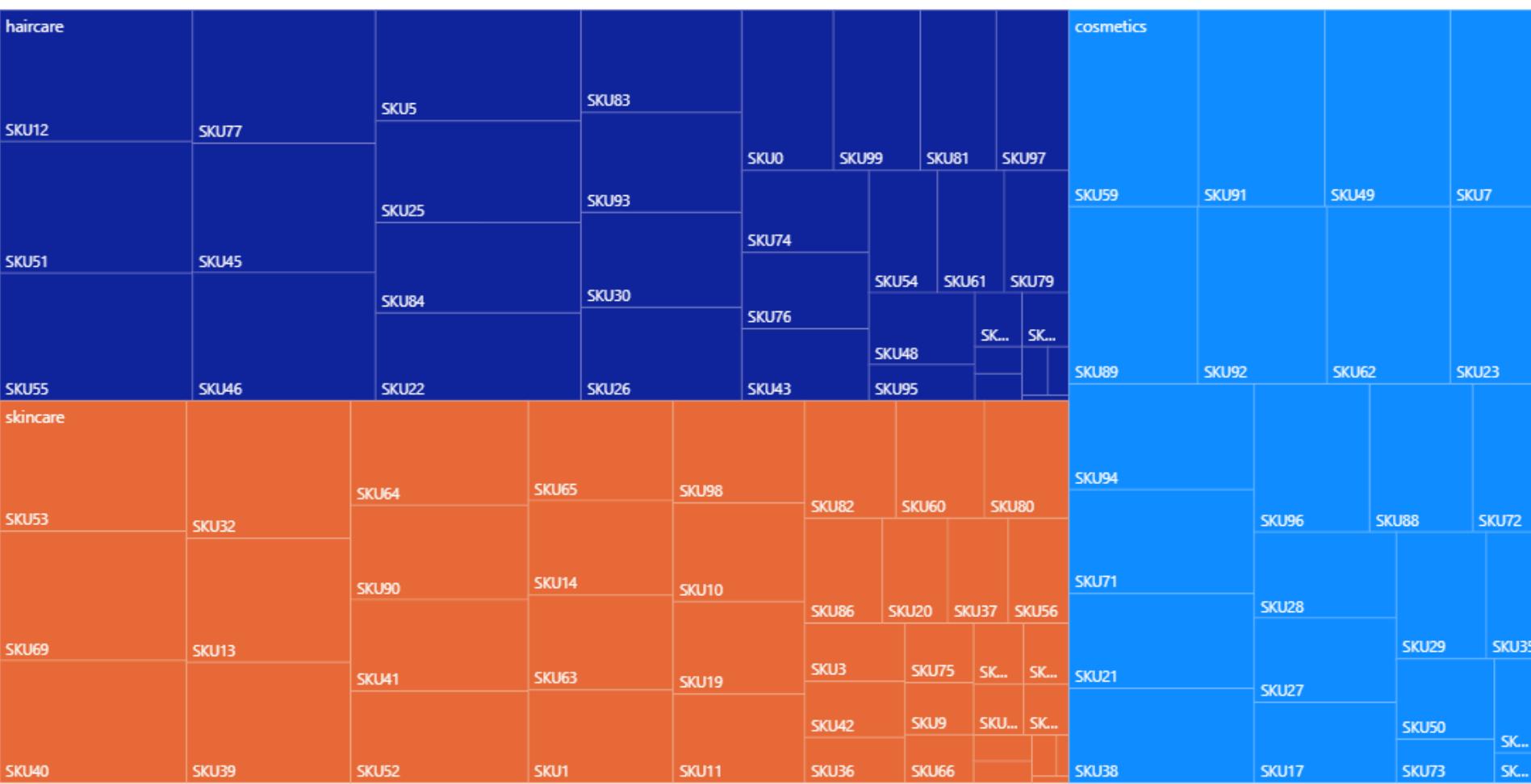
Availability vs Order Quantities Insights

- Skincare shows high availability (~2000) and highest order quantity, indicating strong demand and good stock planning.
- Haircare has balanced availability (~1500) with moderate order quantities, reflecting stable demand.
- Cosmetics shows lower availability and lower order quantities, indicating either slow demand or conservative stocking.
- Overall Insight: Availability aligns well with order patterns – no immediate stock-out risks.

Availability vs Order Quantities



KEY INSIGHTS - Inventory & Operations Overview



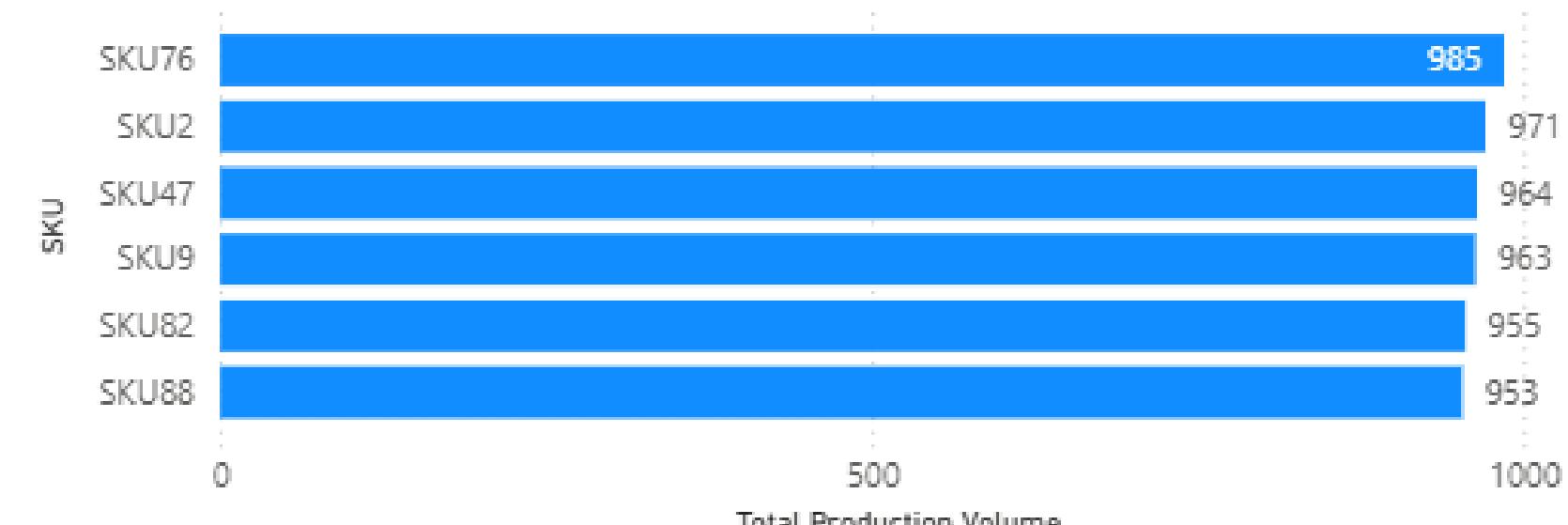
Treemap – SKU Distribution by Product Type – Insights

- Haircare SKUs occupy a major share of the treemap, indicating a diverse product portfolio in this category.
- Skincare also holds a large number of SKUs, supporting its strong revenue performance.
- Cosmetics category shows moderate SKU spread, aligned with demand and production volume.
- Overall Insight: Haircare and Skincare dominate SKU diversity, giving them stronger market coverage.

Top 6 SKUs by Production Volume – Insights

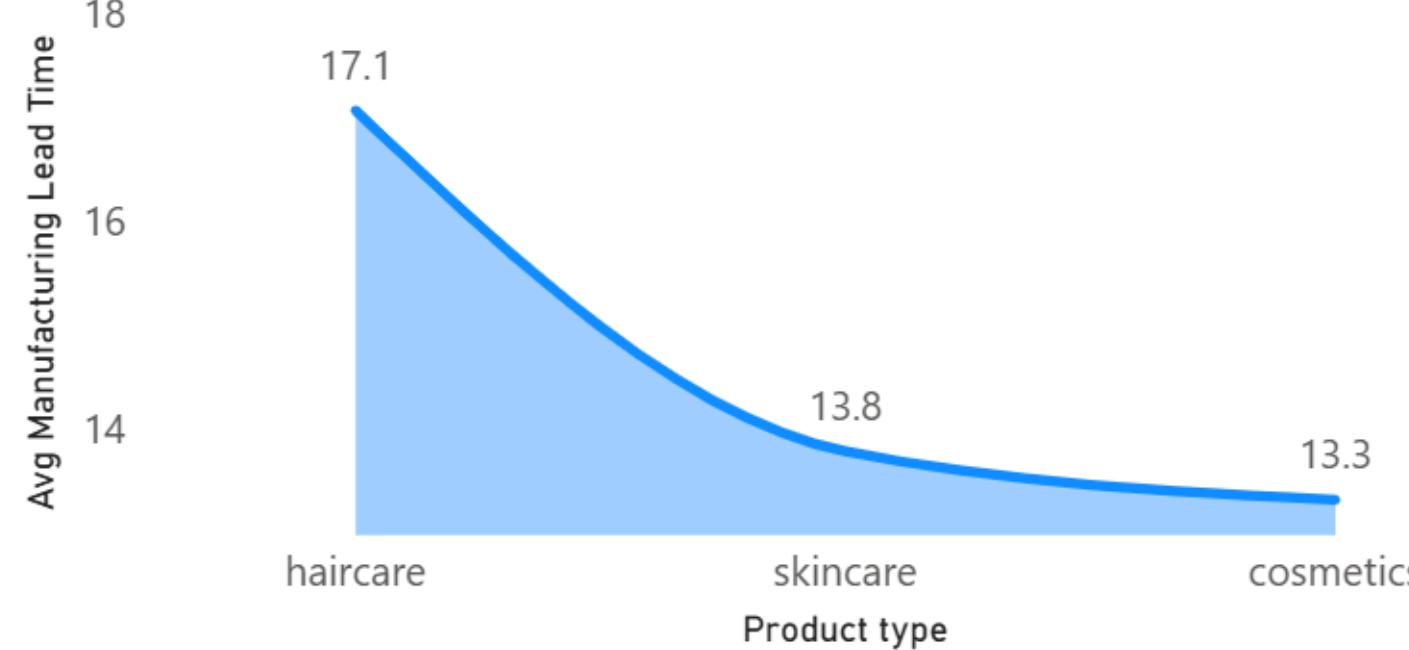
- SKU76 (985 units) and SKU2 (971 units) have the highest production volumes.
- SKU47, SKU9, SKU82, and SKU88 follow closely – all above 950 units.
- Production distribution shows that manufacturing is concentrated on a small set of high-performing SKUs.
- Overall Insight: These top SKUs are critical to business performance and require priority in stock management.

Top 6 SKUs by Production Volume



KEY INSIGHTS - Lead Time & Efficiency Dashboard

Average Manufacturing Lead Time by Product Type



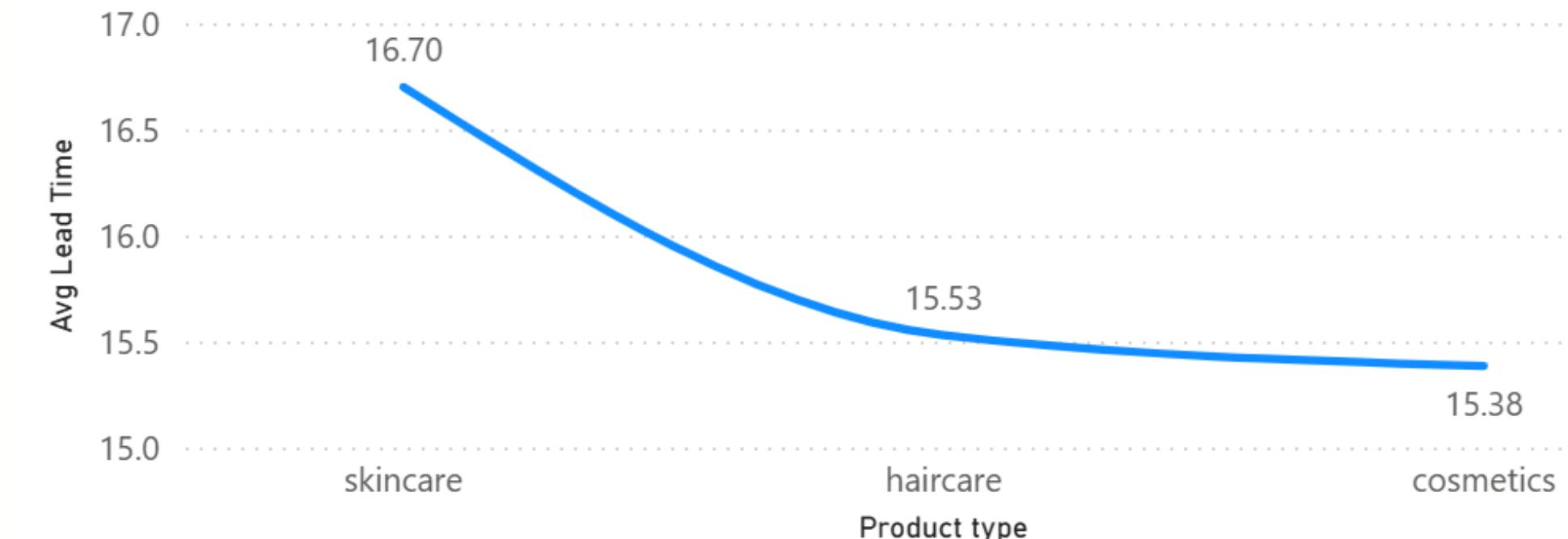
Average Manufacturing Lead Time by Product Type – Insights

- Haircare has the highest manufacturing lead time (17.1 days) → slowest production cycle.
- Skincare (13.8 days) and Cosmetics (13.3 days) have significantly faster manufacturing processes.
- Indicates Haircare production is a major bottleneck in the supply chain.
- Opportunity: Streamline Haircare manufacturing to reduce delays.

Average Lead Time by Product Type – Insights

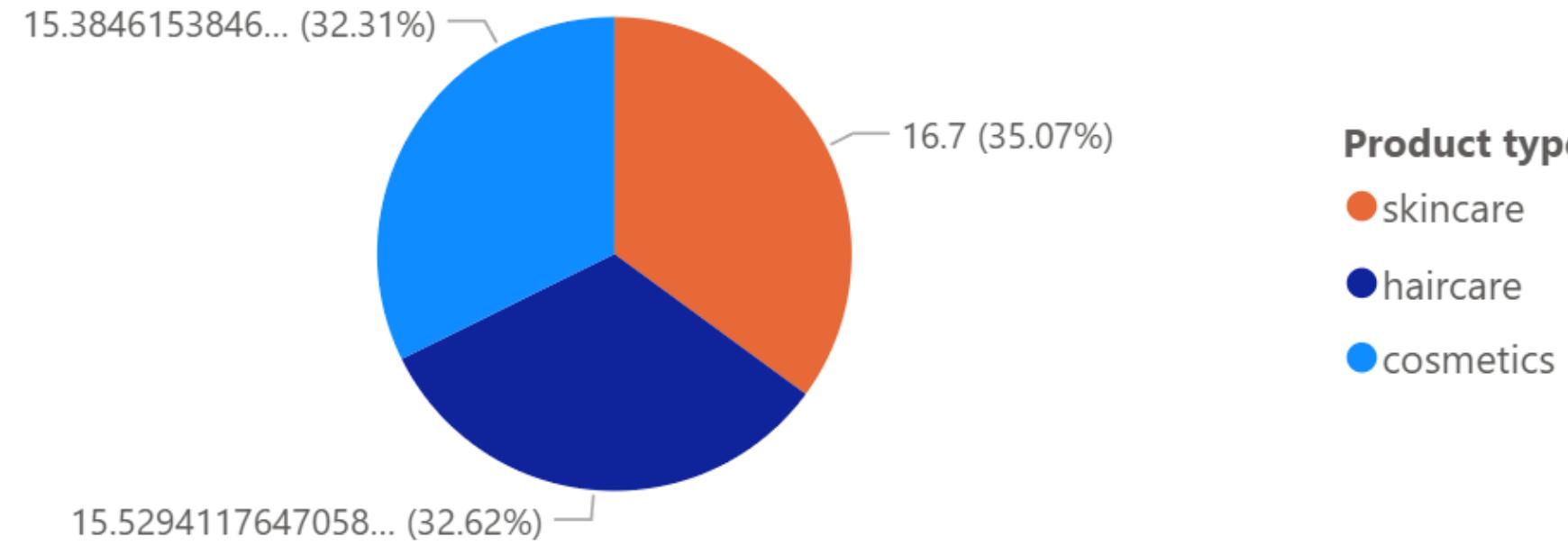
- Skincare has the longest overall lead time (16.7 days).
- Haircare averages 15.53 days, while Cosmetics performs the best at 15.38 days.
- Despite fast manufacturing, Skincare faces slower downstream processes (packaging, transport, or logistics delays).
- Suggests need for optimization beyond the production stage.

Avg Lead Time by Product type



KEY INSIGHTS - Lead Time & Efficiency Dashboard

Avg Lead Time by Product type



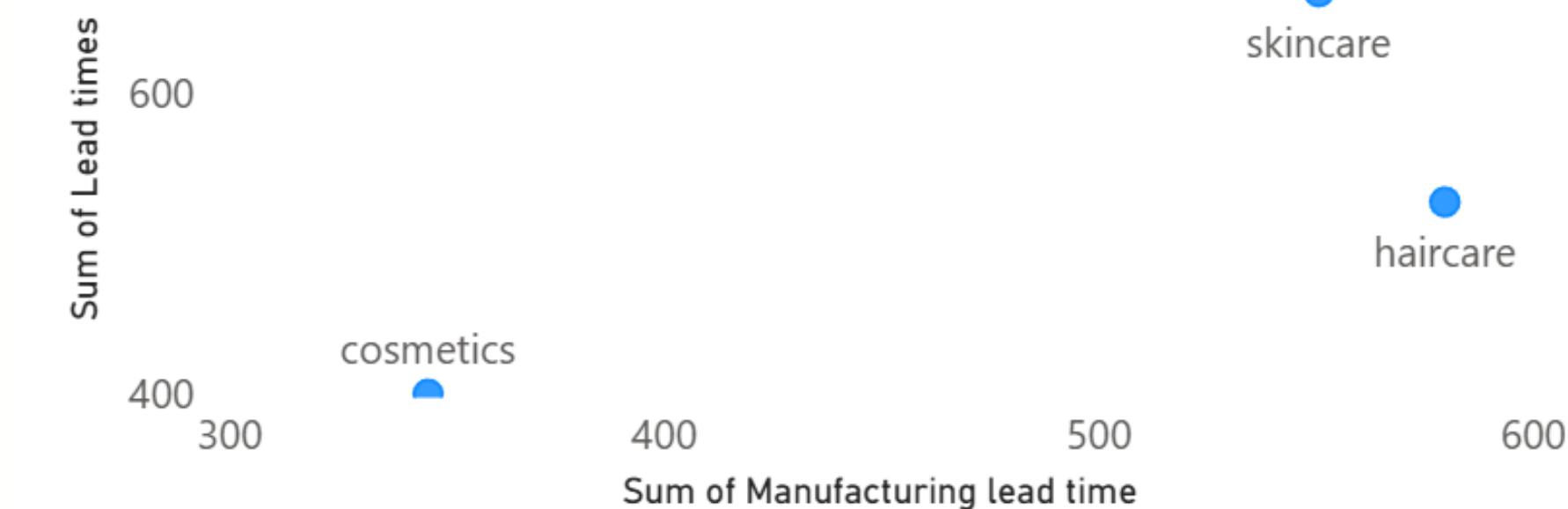
Average Lead Time by Product Type - Insights

- Skincare accounts for the largest share of delays (35%).
- Haircare and Cosmetics contribute almost equally (~32% each).
- The pie chart confirms Skincare is the key driver of total lead time variability, affecting operations consistency.
- Focus here can yield the biggest improvement in delivery reliability.

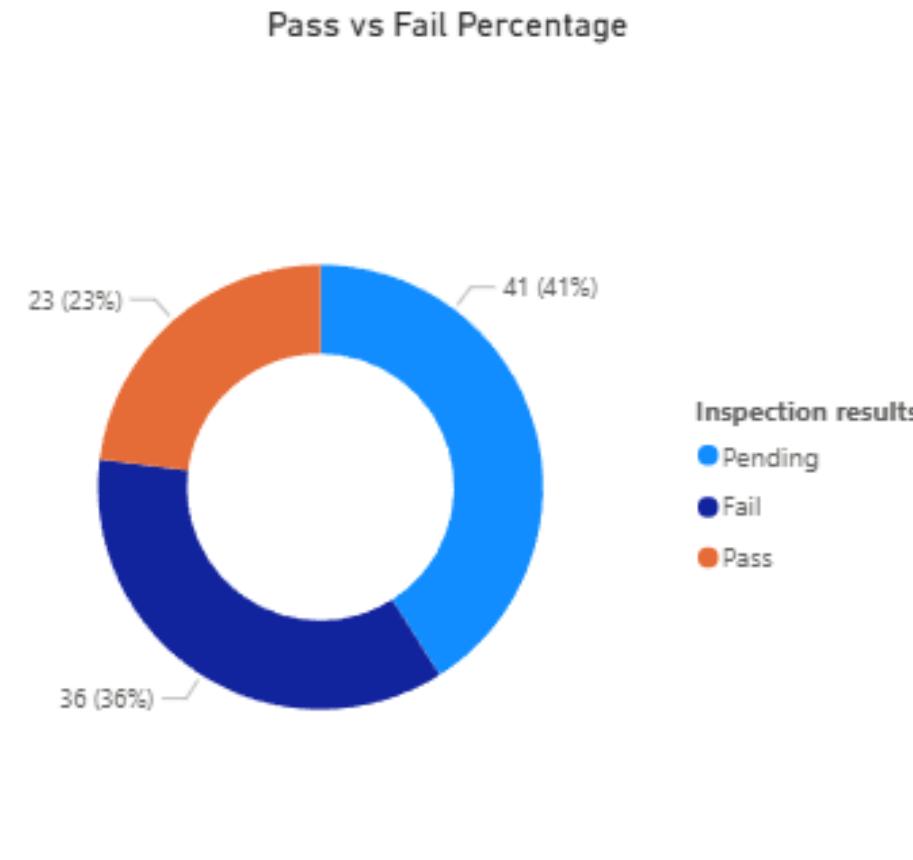
📊 Manufacturing Lead Time vs Total Lead Time - Insights

- Skincare shows highest total lead time despite moderate manufacturing time → strong indicator of logistical or handling delays.
- Haircare: High manufacturing lead time but moderate total lead time → delays mainly occur during production, not logistics.
- Cosmetics: Lowest on both metrics → most efficient category end-to-end.
- Overall: Each category faces different inefficiencies, requiring category-specific strategy.

Sum of Manufacturing lead time and Sum of Lead times by Product type



KEY INSIGHTS - Quality & Defect Analysis



Pass vs Fail Percentage – Insights

- Pass rate is only ~23%, which is very low and signals quality concerns.
- Fail rate stands at ~36%, indicating that over one-third of products fail inspection.
- Pending inspections (~41%) form the largest segment, meaning a major portion of quality evaluation is still incomplete.
- The imbalance between Pass / Fail / Pending suggests operational bottlenecks in the quality-checking process.

Production Volume vs Defect Rate – Insights

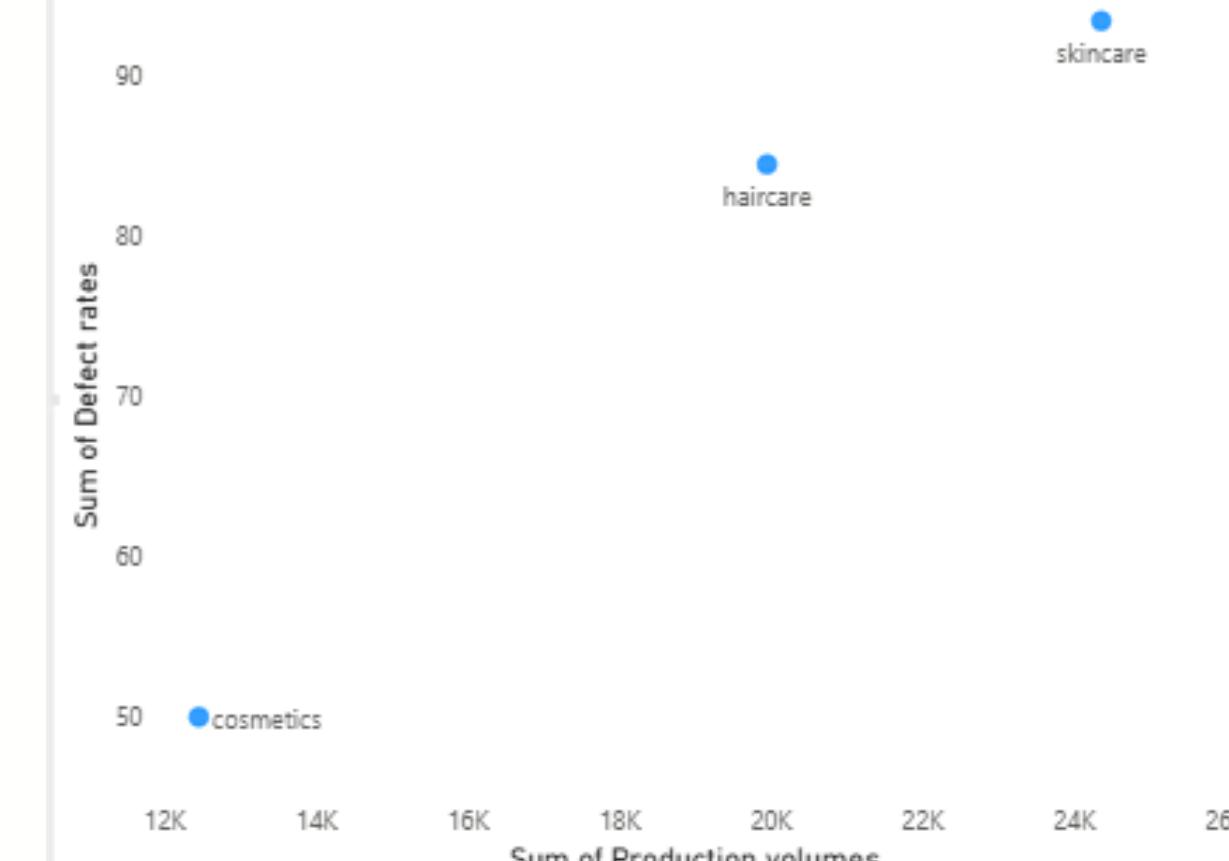
- Skincare has the highest production volume (~25K) but also the highest defect count (~92) – a major red flag.
- Haircare shows moderate production (~20K) with mid-level defects (~84) – still above ideal standards.
- Cosmetics has the lowest production volume (~12K) and the lowest defects (~48) – the most stable product line.

Overall Insight

→ Higher production volumes are correlating with higher defect counts, indicating:

- Strain on the production line
- Possible quality-control lapses under high load
- Need for optimized processes, especially in skincare manufacturing

Sum of Production volumes and Sum of Defect rates by Product type



Future Enhancements

- Real-Time Data Integration
- Enable live updates from ERP/WMS systems to monitor stock, orders, lead times, and quality metrics instantly instead of relying on static datasets.
- Predictive Analytics (Machine Learning)
- Build models to forecast:
 - Future demand by product & location
 - Inventory shortages
 - Expected lead times
 - Probability of defects
 - This will shift the dashboard from descriptive to predictive decision-making.
- Automated Alerts & Notifications
- Trigger alerts for:
 - Low stock
 - High logistics cost
 - Rising defect trends
 - Delayed shipments
 - Helps managers act before issues escalate.

Supplier Performance Tracking

Add KPIs for:

- Supplier delivery accuracy
- Supplier defect contribution
- Cost vs quality comparison
- Enables better vendor decisions.

Drill-Down & Hierarchical Navigation

Allow users to click a chart and drill into:

- SKU → Product Type → Category
- Location → Warehouse → Batch
- Makes the dashboard more interactive and powerful.

Profitability & Cost Optimization Module

Add KPIs showing:

- Profit margin by SKU
- Cost-to-serve by location
- Optimal transport mode suggestions
- Helps in strategic cost reduction.

Mobile-Friendly Dashboard Version

Improve accessibility for operations teams using tablets or phones in the field.

Conclusion

- The analysis highlights clear trends across revenue, logistics, inventory, lead times, and quality performance.
- Skincare consistently emerges as the top-performing category in both revenue and production volume but also shows higher defect rates, indicating the need for process improvement.
- Mumbai and Kolkata are the strongest markets, contributing the highest revenue, while Delhi and Bangalore require strategic focus to boost performance.
- Logistics costs are dominated by Road and Rail, showing reliance on faster but more expensive transportation modes.
- Inventory levels remain stable across categories, but availability vs orders shows gaps that must be minimized to avoid stockouts and lost sales.
- Lead time analysis reveals opportunities to optimize manufacturing and delivery speed, especially in skincare.
- Quality assessment shows critical inefficiencies – low pass rate, high failure rate, and large pending inspections, indicating bottlenecks in the QC workflow.
- Overall, the dashboard enables data-driven decisions, helping identify revenue opportunities, control operational inefficiencies, and improve product quality.



THANK YOU

For Your Attention
Any Questions?

