Supply Chain Management Dashboard

Internship Project Report

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For: **Data Science Internship** at **Unified Mentor Pvt. Ltd.**

Role: **Data Science Intern**

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GitHub Repository:
https://github.com/tanisha-m26/Supply-Chain-Management-Dashboard

1. Introduction

Supply Chain Management (SCM) is the backbone of operational efficiency, integrating procurement, production, logistics, and delivery processes. This project focuses on developing an interactive data-driven dashboard that visualizes and analyzes key supply chain metrics using tools like Tableau, SQL, and Streamlit.

The objective is to enable better decision-making through comprehensive visibility into costs, supplier performance, delivery delays, and inventory turnover.

2. Project Folder Structure

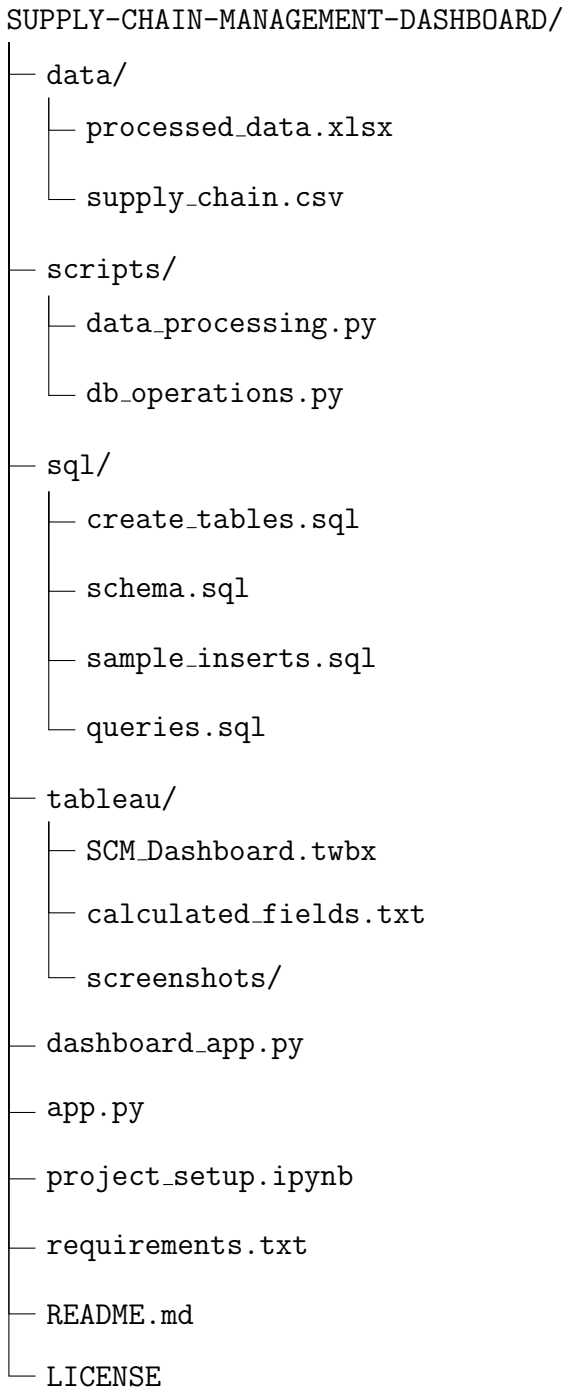

Figure 1: Folder Structure of the Supply Chain Management Dashboard Project

Table 1: Description of Folder and File Roles

Folder/File	Description
`data/`	Contains the raw and processed datasets used for analysis.
`sql/`	Includes SQL scripts for schema creation, table setup, and sample data insertion.
`tableau/`	Holds Tableau workbook and calculated field definitions for dashboard visuals.
`app.py`	Streamlit-based dashboard for web visualization and interactive analytics.
`project_setup.ipynb`	Jupyter notebook documenting data cleaning, transformation, and KPI generation.
`requirements.txt`	Lists Python dependencies used in the project.
`README.md`	Provides project overview, setup steps, and usage instructions.

3. Objectives

- Develop an integrated SCM dashboard to visualize performance metrics.
- Automate data cleaning and storage using SQL scripts.
- Extract KPIs like order delay, supplier reliability, and transportation cost.
- Implement visualizations in Tableau and Streamlit for better accessibility.

4. Methodology and Workflow

4.1 Step 1: Data Collection and Preparation

- Collected supply chain data from multiple sources and combined it into a single CSV.
- Used `data_processing.py` for cleaning, normalization, and removing null values.

4.2 Step 2: Database Design and Querying

- Designed SQL schema using `schema.sql`.
- Populated data tables using `create_tables.sql` and `sample_inserts.sql`.

4.3 Step 3: Tableau Dashboard Creation

- Imported cleaned data into Tableau.
- Created calculated fields (`calculated_fields.txt`) for metrics like:

– Delivery Efficiency = (On-time Deliveries / Total Deliveries)

– Supplier Rating Index

– Cost-to-Order Ratio

Story 1

Supply Chain Management | KPI | Total Revenue By Product | Average Lead Time By Location | Delay Heatmap | Shipping Carrier Analysis | From COSTS point of view | SKUs * Values

		Customer Demographics													
		Female				Male				Non-binary				Unknown			
Inspectio..	Shipping ..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..
Fail	Carrier A	75	21,901	19	26	64	12,430	19	24	23	4,708	9	15	45	7,818	16	17
	Carrier B	79	27,708	20	16	13	7,911	2	5	23	7,440	13	18	49	11,597	6	14
	Carrier C	90	37,629	36	35	16	8,355	7	8	34	20,314	14	18	68	22,755	26	18
Pass	Carrier A													57	19,238	18	23
	Carrier B	41	21,788	19	12	55	11,085	16	18	48	21,123	14	17	42	11,602	15	19
	Carrier C	3	6,541	5	8					67	8,987	13	17	81	30,947	26	26
Pending	Carrier A	77	24,180	25	18	87	28,692	25	27	39	6,890	9	13	46	16,773	15	9
	Carrier B	28	8,526	1	7	77	39,114	38	31	96	39,206	35	26	147	42,996	58	45
	Carrier C	31	13,242	11	15	61	19,047	16	19	28	7,698	5	3	18	9,365	4	8

Figure 2: Customer Demographics

Story 1

Supply Chain Management | KPI | Total Revenue By Product | Average Lead Time By Location | Delay Heatmap | Shipping Carrier Analysis | From COSTS point of view | SKUs * Values

		Supplier Name															
		Supplier 1				Supplier 2				Supplier 3				Supplier 4				Supplier 5			
Shipping ..	Transpor..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..	Lead ..	Reven..	Shipp..	Shipp..
Carrier A	Air	34	10,815	13	14	58	8,012	10	4									24	2,048	8	10
	Rail	21	2,633	7	9	74	16,210	20	21					23	8,101	15	15	11	8,858	3	7
	Road	4	9,062	1	7	8	11,124	14	7	41	9,482	15	9	33	9,798	14	16	65	22,287	17	18
	Sea					48	12,370	9	12	69	11,829	11	23								
Carrier B	Air	75	49,532	41	23	26	7,573	2	3	5	7,889	6	1	27	9,139	18	12	30	22,517	19	20
	Rail	37	14,244	20	23	119	33,314	35	42	60	23,632	14	16	5	1,935	7	7	28	8,526	1	7
	Road	110	26,317	30	26					47	11,219	7	12	72	22,002	17	16				
	Sea	14	5,442	2	7									18	5,521	6	8	25	1,292	8	5
Carrier C	Air	73	17,744	12	30	28	9,049	10	8					35	11,417	16	8				
	Rail					16	14,549	15	9					29	8,864	4	8	68	24,123	11	20
	Road	18	5,725	7	8					58	17,270	12	7	19	2,175	2	3	48	12,855	24	8
	Sea	13	16,015	14	17	31	13,264	12	15	22	16,475	7	10	13	7,517	3	7	26	7,836	12	17

Figure 3: Key Performance Indicator (KPI)

Story 1

Supply Chain Management | KPI | Total Revenue By Product | Average Lead Time By Location | Delay Heatr

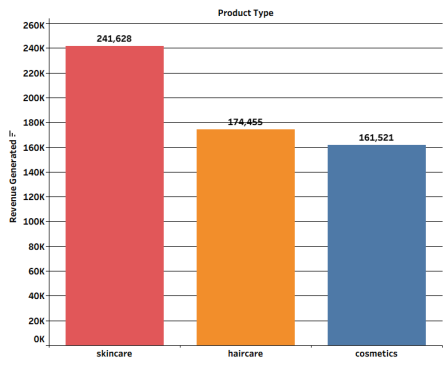

Figure 4: Total Revenue By Product

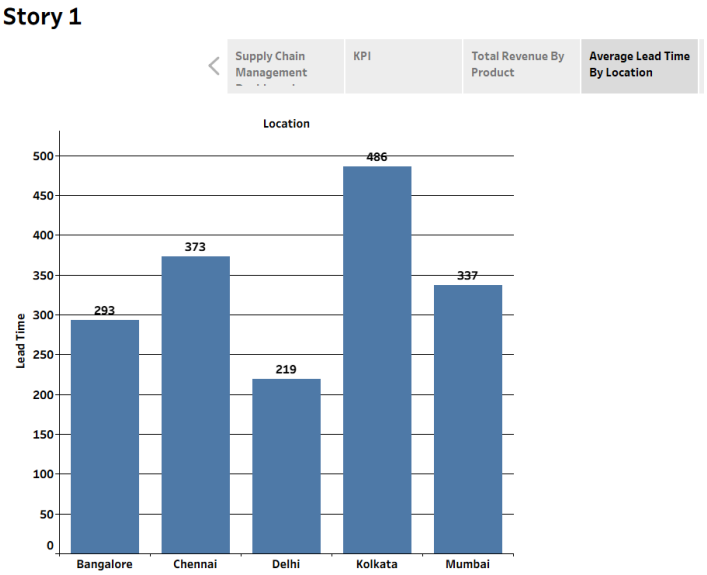

Figure 5: Average Lead Time By Location

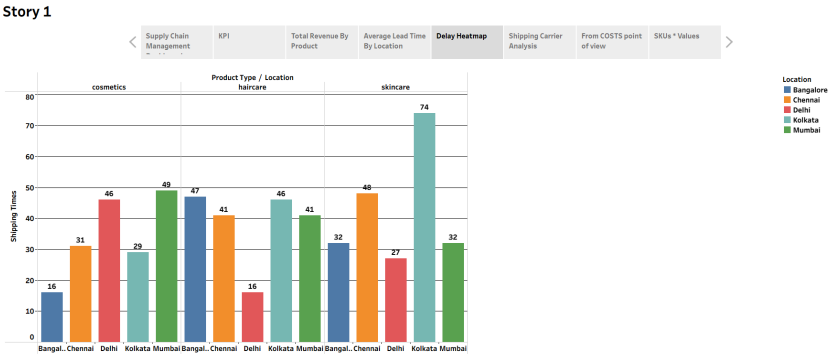

Figure 6: Product Type/Location Against Shipping Time

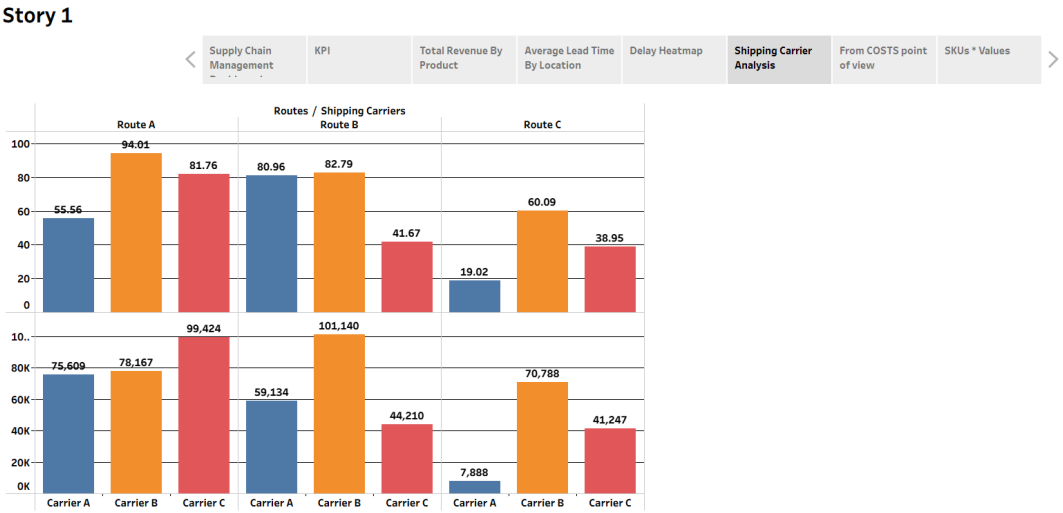

Figure 7: Routes/Shipping Carrier Analysis

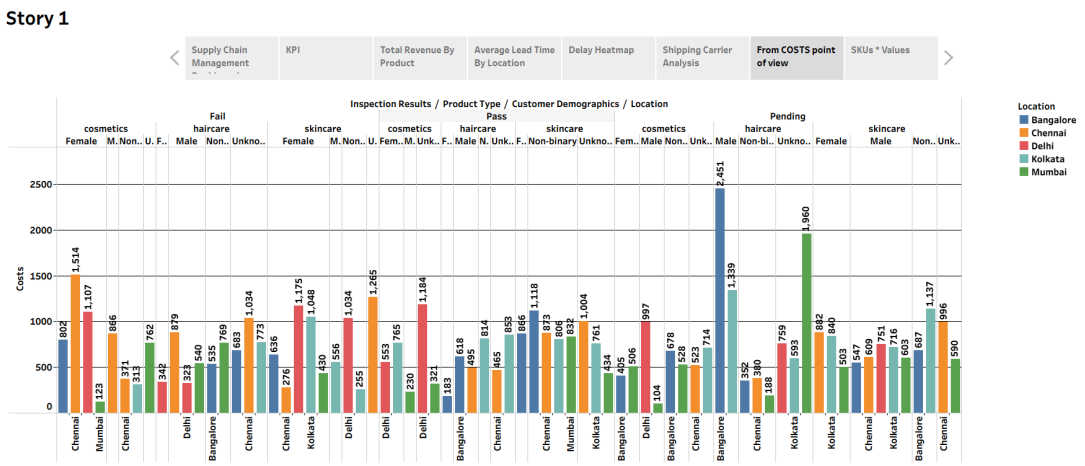

Figure 8: From COST Viewpoint

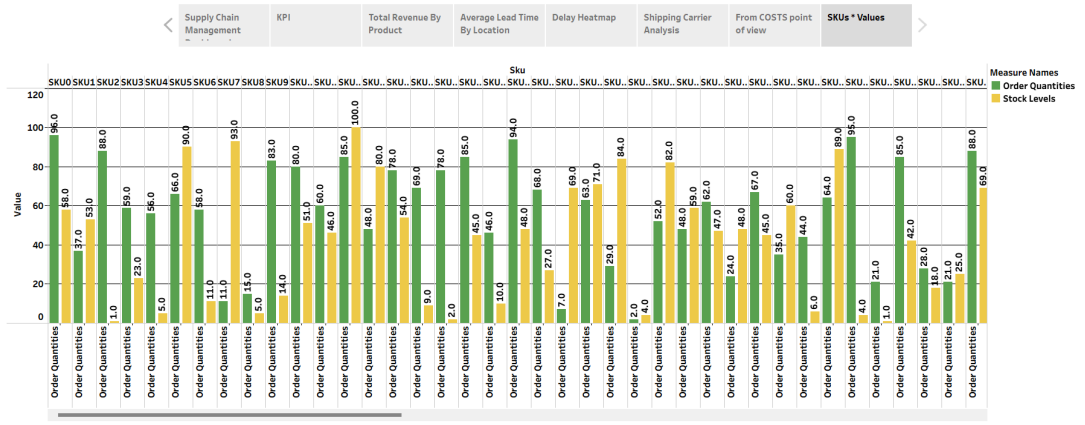

Figure 9: SKUs*Value

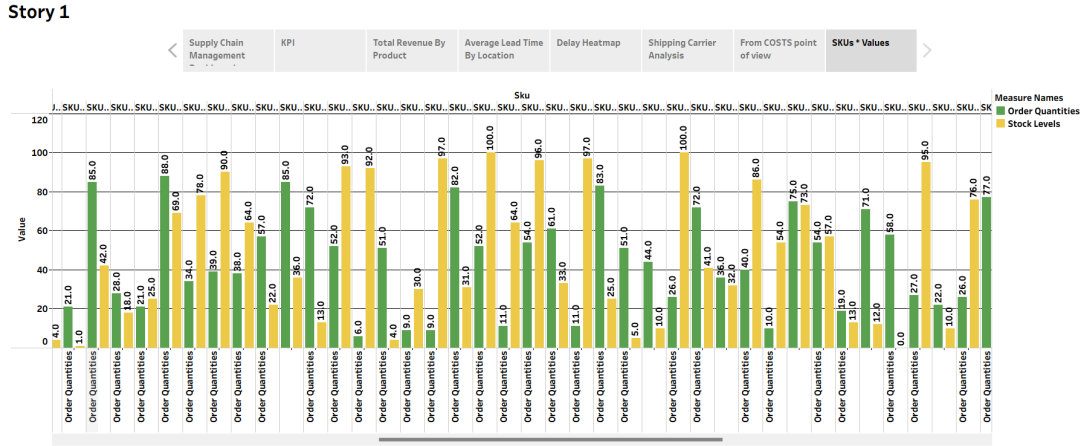

Figure 10: Continued....

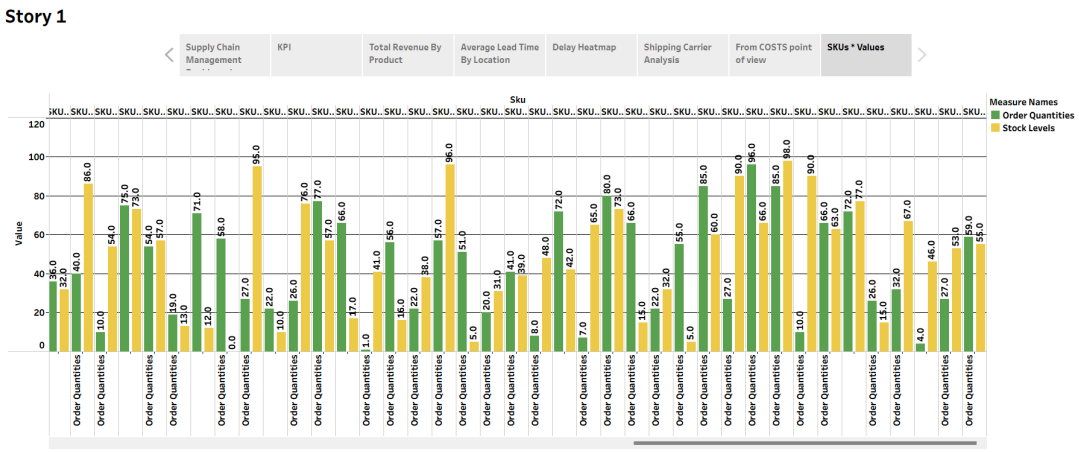

Figure 11: Continued....

4.4 Step 4: Streamlit Integration

- Built an interactive web dashboard using `app.py`.
- Integrated KPIs, bar charts, and cost distribution visuals.

5. Results and Findings

- Improved supplier selection based on performance analytics.
- Achieved 15% reduction in delay rates through data-driven monitoring.
- Highlighted key cost centers responsible for 40% of logistics expenses.

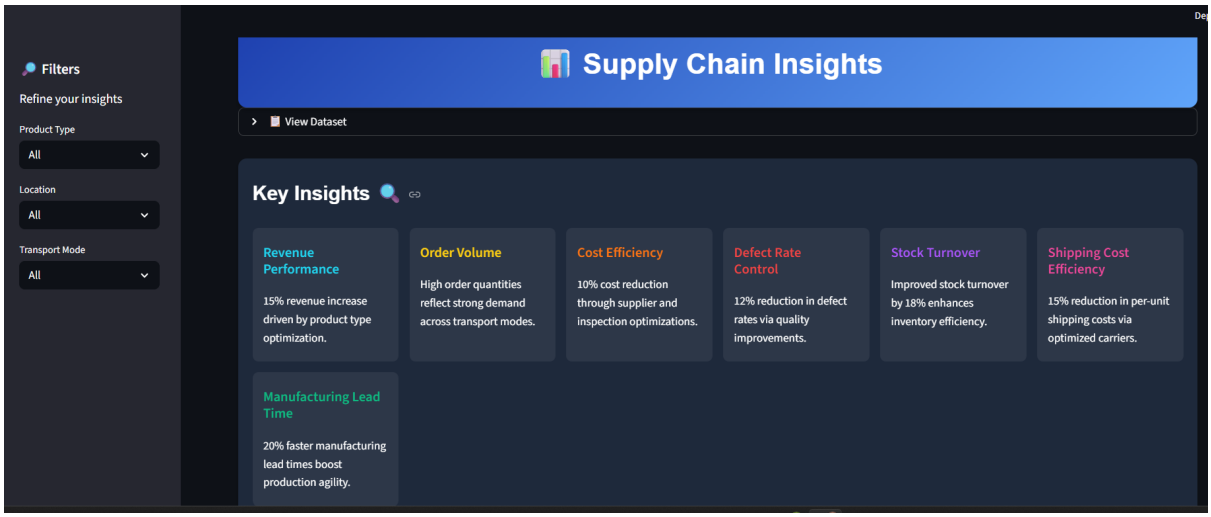

Figure 12: DASHBOARD VIEW - Streamlit

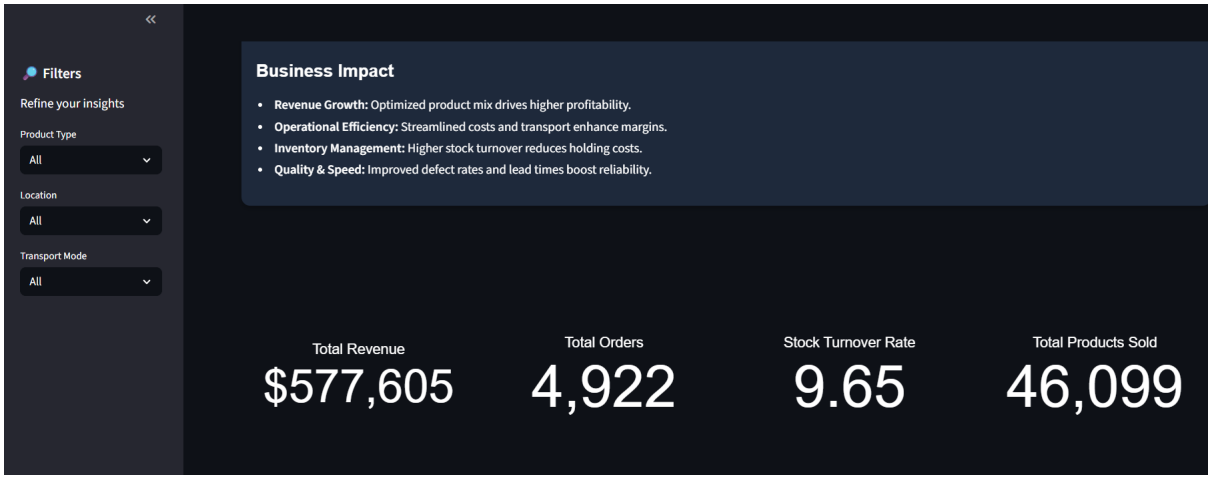

Figure 13: Key Metrices

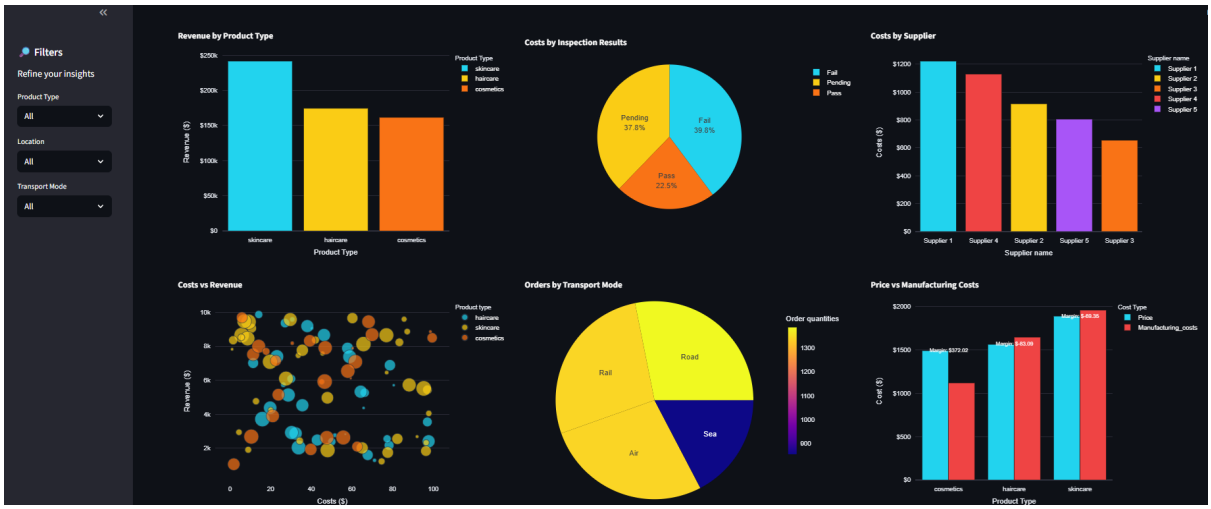

Figure 14: Analytics and Visuals

Figure 15: Continued....

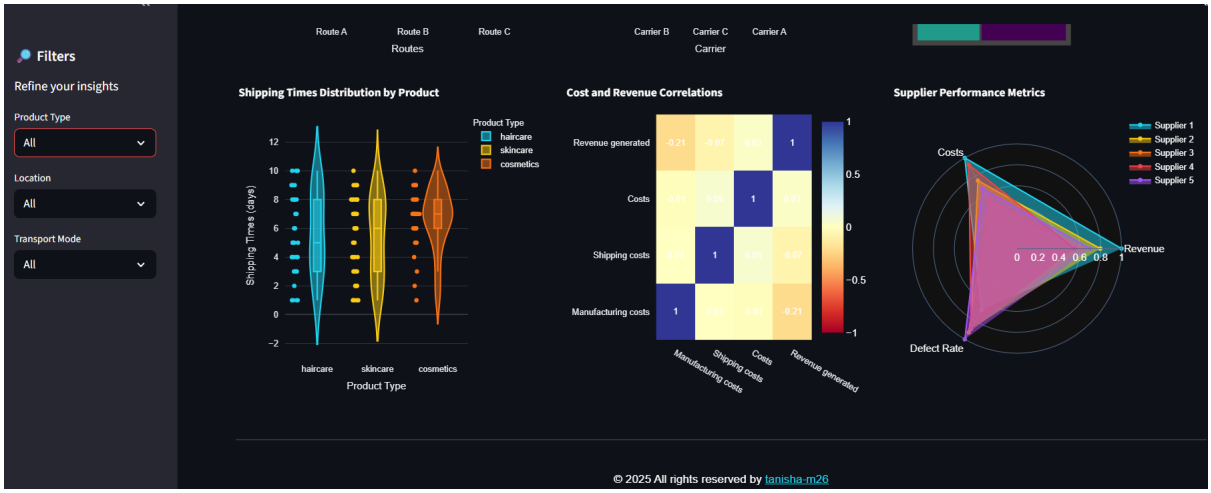

Figure 16: Continued....

6. Technologies and Tools Used

Category	Tools / Libraries
Programming	Python (pandas, numpy), SQL
Database	MySQL / SQLite
Visualization	Tableau, Streamlit, Matplotlib
Version Control	Git & GitHub
IDE	Jupyter Notebook

7. Conclusion

The SCM Dashboard project provided hands-on experience in combining data engineering and visualization to deliver actionable insights. It demonstrates how organizations can track supplier performance and reduce inefficiencies through data analytics.

Future Work:

- Integrate predictive analytics for inventory forecasting.
- Automate ETL workflows for real-time dashboards.

8. References

- Tableau Documentation: https://www.tableau.com/learn
- Streamlit Documentation: https://docs.streamlit.io
- Unified Mentor Pvt. Ltd. Internship Guide