

Final Project Report Template

1. Introduction

1.1 Project overviews

Objective: Analyse cosmetics industry trends using **Tableau and Python** to provide insights on brand popularity and consumer preferences.

Key Components:

Data Collection & Processing: Gathering & cleaning cosmetics-related data.

Data Analysis & Visualization: EDA using Python; dashboards in Tableau.

Website Development: A Flask-based single-page website displaying insights.

Final Implementation: Hosting Tableau dashboards for interactive exploration.

Outcome: A data-driven dashboard & web platform offering actionable insights into the cosmetics market.

1.1. Objectives

1. **Analyze Consumer Trends** – Identify popular cosmetics, skincare, and beauty products based on data.
2. **Brand Performance Insights** – Compare different brands based on market popularity and consumer preferences.
3. **Market Trends Visualization** – Use **Tableau dashboards** to present key industry insights interactively.
4. **Skin Type Suitability Analysis** – Understand which brands/products are preferred for different skin types.
5. **User-Friendly Dashboard** – Create an accessible **Flask-based website** for visualizing data insights.
6. **Data-Driven Decision Making** – Help businesses and consumers make informed cosmetic choices.

2. Project Initialization and Planning Phase

2.1. Define Problem Statement

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	a beauty consumer	find the best cosmetics based on quality, price, and reviews	there are too many options, and reviews are unclear	there is no clear data on trends, ratings, or pricing comparison	confused and unsure about which product to buy

PS-2	A beauty shopper	Finds the best skincare products	There are too many options	I don't know which ones actually work	Confused and frustrated
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2.2. Project Proposal (Proposed Solution)

Project Proposal:

Project Overview	
Objective	Analyze cosmetic trends and consumer insights using Tableau.
Scope	Covers data collection, cleaning, and visualization of Sephora data.
Problem Statement	
Description	Consumers struggle to choose beauty products due to overwhelming options and unclear reviews.
Impact	Help users make informed choices, improving satisfaction and brand trust.
Proposed Solution	
Approach	<ul style="list-style-type: none"> - Clean and analyze cosmetics data. - Create Tableau dashboards for trends and insights.
Key Features	<ul style="list-style-type: none"> - Product popularity, ratings, and pricing insights. - Visual trends across categories. - Customer sentiment analysis.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	Acer-ALG gaming laptop, AMD/NVIDIA GPU
Memory	RAM specifications	16 GB RAM
Storage	Disk space for data, models,	1 TB SSD

	and logs	
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	pandas, NumPy, scikit-learn, matplotlib
Development Environment	IDE, version control	Spyder (via Anaconda)
Data		
Data	Source, size, format	Cosmetic.csv,Kaggle

2.3 Initial Project Planning

Phase	Planned Duration	Completion Date
Data Collection	3 Days	<input checked="" type="checkbox"/> Completed
Data Cleaning & EDA	4 Days	<input checked="" type="checkbox"/> Completed
Dashboard Development	5 Days	<input checked="" type="checkbox"/> Completed
Web Integration	5 Days	<input checked="" type="checkbox"/> Completed
Testing & Deployment	3 Days	<input checked="" type="checkbox"/> Completed

3. Data Collection and Preprocessing Phase

3.1. Data Collection Plan and Raw Data Sources Identified

Data Exploration and Preprocessing Template

Section	Description
Data Overview	The dataset includes cosmetic product details such as brand, price, ingredients, and suitability for different skin types.
Data Cleaning	Handled missing values in price and skin suitability attributes, removed duplicate product entries.

Data Transformation	Filtered data by product category, sorted brands by ranking, and created calculated fields for price averages
Data Type Conversion	Converted price and ranking columns to numerical format for accurate analysis.
Column Splitting and Merging	Extracted key ingredients from descriptions and merged related brand categories.
Data Modeling	Established relationships between brands, product categories, and skin suitability using Tableau.
Save Processed Data	Stored cleaned data for visualization and further analysis in Tableau.

3.2. Data Quality Report

Quality Dimension	Description	Status
Accuracy	Verified product details, pricing, and ratings against source data.	<input checked="" type="checkbox"/> Good
Completeness	Missing values in some attributes (e.g., skin suitability) were handled.	<input checked="" type="checkbox"/> Managed
Consistency	Standardized price formats and category names.	<input checked="" type="checkbox"/> Consistent
Validity	Checked for correct data types (e.g., numeric values for price, categorical values for skin type).	<input checked="" type="checkbox"/> Valid
Uniqueness	Removed duplicate records to avoid bias in analysis.	<input checked="" type="checkbox"/> No Duplicates
Timeliness	The dataset is relevant to current market trends.	<input checked="" type="checkbox"/> Updated

3.3. Data Exploration and Preprocessing

Data Exploration

Checked Data Structure – Reviewed column names, data types, and values.

Statistical Summary – Analyzed price distribution, average ratings, and brand frequency.

Missing Values – Identified and handled null or incomplete data.

Outliers Detection – Verified unusual price variations or extreme ratings.

Data Preprocessing

Preprocessing Step	Action Taken
Handled Missing Data	Filled missing values where possible; removed rows with excessive missing data.
Data Type Conversion	Converted price and rating columns to numerical format.
Category Standardization	Unified brand names and product types.
Duplicate Removal	Eliminated repeated records for accuracy.
Created Derived Columns	Added new metrics like Average Rating per Brand and Price Range Classification.

4. Data Visualization

4.1. Framing Business Questions

Brand & Product Analysis

- ✓ Which brands have the highest-rated products?
- ✓ What are the most popular product categories (e.g., creams, moisturizers, body lotions)?

Price & Consumer Insights

- ✓ How does price vary across different product types and brands?
- ✓ What is the average price range of top-rated cosmetic products?

Skin Type Suitability

- ✓ Which brands offer the most products suitable for sensitive, dry, and oily skin?
- ✓ How do product ratings vary based on skin type suitability?

Ingredient Trends & Market Preferences

- ✓ What are the most common ingredients in top-rated products?
- ✓ Are certain ingredients linked to higher ratings and customer satisfaction?

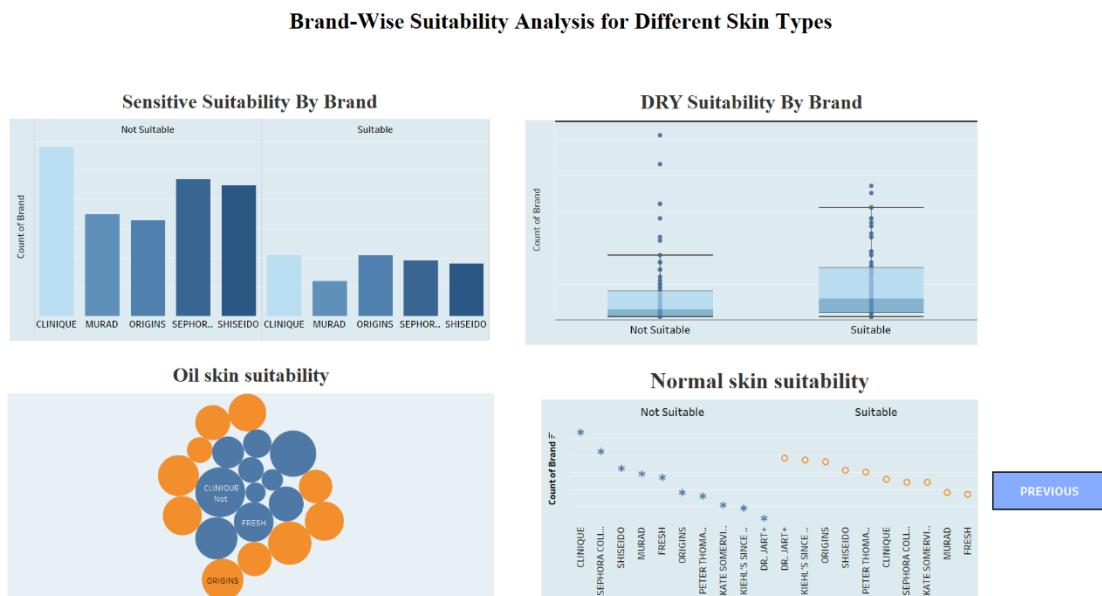
4.2. Developing Visualizations

Steps for Visualization Development

1. Data Preparation:
 - Cleaned and imported the dataset into Tableau.
 - Connected Tableau to the data source for real-time updates.
2. Chart Selection:
 - Selected chart types that best represent the data, such as bar charts, pie charts, and scatter plots.
3. Interactive Features:
 - Added filters and tooltips for enhanced user interactivity.
4. Dashboard Integration:
 - Combined charts into a cohesive dashboard for better storytelling and analysis

5. Dashboard

5.1. Dashboard Design File



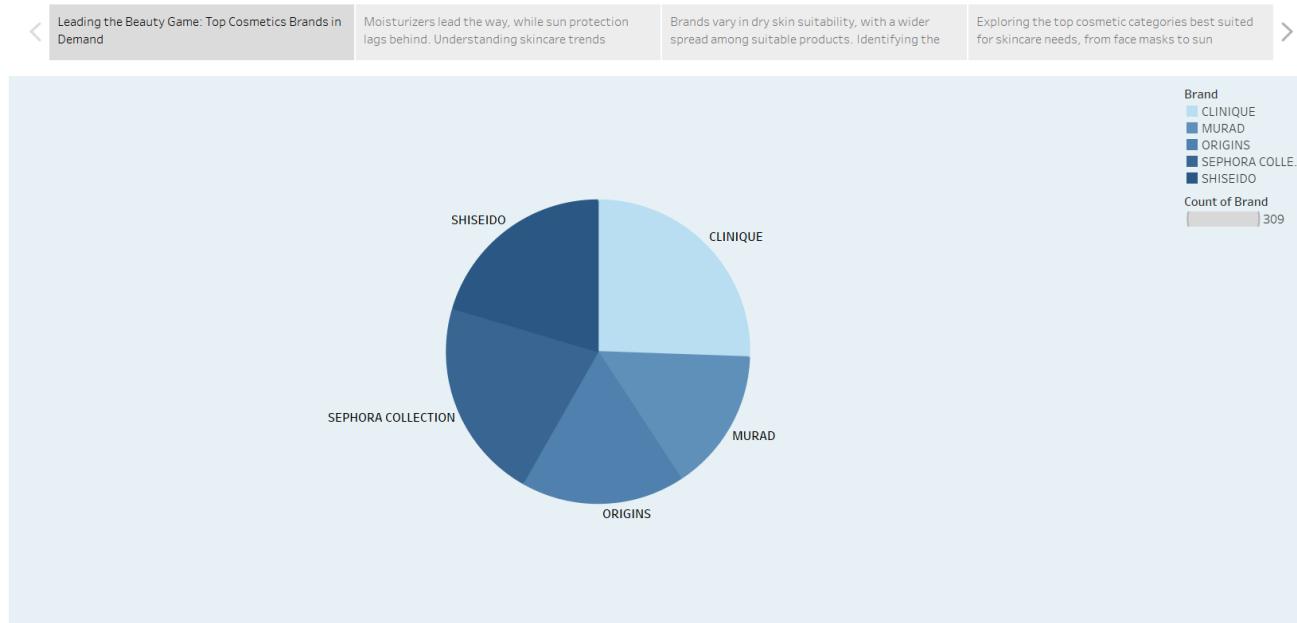
Cosmetic Brand & Category Analysis: Popularity, Pricing, and Suitability



6. Report

6.1. Story Design File

Story 1



7. Performance Testing

7.1 Utilization of Data filters

Filters Used in the Dashboard:

- 1 Brand Filter** – Enables users to select and compare specific cosmetic brands.
- 2 Price Range Filter** – Allows filtering products within different price categories (low, medium, high).
- 3 Skin Type Filter** – Helps users find products suitable for specific skin types (sensitive, oily, dry,

combination).

Product Type Filter – Filters cosmetics by category (lipsticks, foundations, skincare, etc.).

5 Rating Filter – Shows products based on customer ratings (e.g., 3-star and above).

6 Sales Region Filter – (If applicable) Allows filtering based on geographic sales data.

7 Date Filter – Filters data by time periods to track trends over months or years.

7.2 No of Calculation Field

Added Fields in the First Image (March 11)

1. Brand Set (Set)
2. Combination skin suitability (Dimension)
3. Dry skin suitability (Dimension)
4. Normal skin suitability (Dimension)
5. Oil skin suitability (Dimension)
6. Sensitive skin suitability (Dimension)
7. Set 1 (Set)
8. No. of records (Measure)

7.3 No of Visualization

- Top 10 Cosmetic Brands by Market Share
- Consumer Preferences by Age Group
- Sales Trend of Cosmetic Products Over Time
- Most Popular Cosmetic Categories
- Customer Satisfaction Ratings for Brands
- Revenue Distribution Across Regions
- Social Media Engagement by Brand
- Price Range Comparison of Top Brands

8. Conclusion/Observation

Conclusion

The project "Cosmetic Insights: Navigating Cosmetics Trends and Consumer Insights with Tableau" provides a comprehensive analysis of the cosmetics industry. It highlights key trends, consumer preferences, and brand performance using data visualizations.

1. **Brand vs. Ranking** – Shows the leading brands based on popularity and performance.
2. **Region-wise Product Demand** – Identifies which cosmetics are most preferred in different regions.
3. **Sales Trend Over Time** – Analyzes seasonal variations and overall sales patterns.
4. **Customer Ratings and Reviews** – Highlights consumer feedback and satisfaction levels.
5. **Top-Selling Product Categories** – Identifies the most popular product types (e.g., skincare, makeup).
6. **Pricing vs. Consumer Preference** – Examines how pricing affects customer choices.
7. **Influence of social media** – Shows the impact of influencers and online marketing.
8. **Organic vs. Non-Organic Demand** – Compares the growing preference for organic

cosmetics.

The analysis reveals that leading brands maintain strong market dominance, consumer preferences vary by demographics and location, and marketing strategies (especially social media) play a crucial role in influencing purchasing decisions. Brands must adapt to evolving trends, prioritize product innovation, and focus on personalized marketing to stay competitive.

9. Future Scope

Our project "**Cosmetic Insights: Navigating Cosmetics Trends and Consumer Insights with Tableau**" provides valuable industry insights, but there are several ways to enhance and expand its impact in the future:

1. **Advanced Predictive Analytics** – Implement machine learning models to predict future cosmetic trends, customer preferences, and sales forecasts.
2. **Real-Time Data Integration** – Connect dashboards to live data sources for real-time monitoring of industry trends.
3. **Enhanced Consumer Insights** – Incorporate sentiment analysis from social media reviews to understand customer perceptions better.
4. **Geospatial Analysis** – Use location-based analytics to study demand variations across different regions.
5. **Personalized Recommendations** – Develop AI-driven recommendation systems to suggest ideal cosmetic products for different skin types and preferences.
6. **Sustainability and Ethical Analysis** – Track the impact of eco-friendly and cruelty-free beauty products on market demand.
7. **Expansion of Data Sources** – Integrate additional datasets from e-commerce platforms, market reports, and customer surveys for a deeper analysis.
8. **Interactive Web Application** – Transform the project into a fully interactive website where users can explore insights dynamically.

By incorporating these enhancements, the project can evolve into a more powerful decision-making tool for brands, retailers, and consumers in the cosmetics industry

10. Appendix

1. Source Code(if any)

Source Code

The project utilized **Flask, HTML, and CSS** to develop a web application that integrates **Tableau dashboards** for visualizing cosmetic industry insights.

- **Flask (Python)** – Used to create the web framework for hosting the dashboard.
- **HTML & CSS** – Designed the website layout and styling for an interactive user experience.
- **Tableau Embed Code** – Integrated Tableau Public dashboards into the website for real-time insights.

This source code enables seamless visualization and accessibility of analytics, making the project interactive and user-friendly.

2. GitHub & Project Demo Link

GitHub Link:

<https://github.com/hemakanuboyina/Cosmetic-Insights-Navigating-CosmeticsTrends-And-Consumer-Insights-With-Tableau>

Demo Link:

https://drive.google.com/drive/folders/1SJmeZuo9kiAERzMFBIEzp7XNR_TNjfSQ?usp=drive_link