

# Comparative Data Analysis and Visualization of Sales Performance for Flutur Shop in Kosovo and North Macedonia

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**Abstract**—This research paper presents a comprehensive data analysis and visualization of Flutur Shop’s sales performance in Kosovo and North Macedonia. Our objective is to understand the underlying patterns and trends that can provide valuable insights for strategic decision-making and future growth. We have analyzed the data using various descriptive statistics, time series analysis, product analysis, geographic analysis, salesperson analysis, cancellation analysis, and discount analysis. Our methodology includes data preprocessing, data wrangling, and the utilization of modern data visualization techniques using Python libraries such as pandas, matplotlib, seaborn, and Plotly.

By comparing the sales performance across both countries, we have identified key differences and similarities in product preferences, sales trends, and market dynamics. The results of our analysis offer a better understanding of the customer base and market potential in each country, enabling Flutur Shop to optimize its operations, marketing strategies, and product offerings. Furthermore, we discuss the limitations of our study and propose directions for future research to enhance the scope and depth of the analysis.

**Index Terms**—sales data analysis, data visualization, beauty industry, magnetic lashes, Flutur Shop, Kosovo, North Macedonia, customer preferences, product performance, market trends.

## I. INTRODUCTION

The beauty industry is a highly competitive and rapidly evolving market, with new products and trends emerging constantly. In this context, it is crucial for businesses operating in the industry to have a deep understanding of their sales performance, customer preferences, and market trends in order to remain successful and competitive. Flutur Shop, an online retailer specializing in magnetic lashes, is one such business operating in Kosovo and North Macedonia. Magnetic lashes have gained popularity in recent years as a convenient and reusable alternative to traditional glue-on eyelashes, offering users an easy way to enhance their appearance without the mess and hassle of traditional methods.

This research paper aims to analyze the sales data of Flutur Shop to provide valuable insights into product popularity, customer preferences, and market trends in Kosovo and North Macedonia. By employing various data analysis techniques

and visualization tools, the study seeks to uncover patterns and insights that can help Flutur Shop make informed decisions about marketing efforts, product offerings, and strategies for growth in both countries.

The paper is structured as follows: first, we review related work in the field of sales data analysis and its relevance to the beauty industry. Next, we describe the methodology employed in this research, detailing the data analysis techniques and visualization tools used. Following this, we present the implementation of the research, including data cleaning, preprocessing, and segmentation. The results section discusses the findings and patterns identified in the sales data, while the conclusions section summarizes the implications of these findings for Flutur Shop’s business strategy. Finally, we outline potential avenues for future work in this area.

By providing a comprehensive analysis of Flutur Shop’s sales performance and customer preferences in Kosovo and North Macedonia, this research paper contributes to the growing body of knowledge in the field of sales data analysis and its applications in the beauty industry.

## II. RELATED WORK

The analysis of sales data has become an essential aspect of modern business operations, as it provides insights into customer behavior, preferences, and trends that can inform decision-making processes. This is particularly true in the beauty industry, where the rapid pace of change and consumer preferences can make or break a business. Several studies and research efforts have focused on various aspects of sales data analysis, and some of these are discussed below.

Consumer behavior in the beauty industry: Multiple studies have explored consumer behavior within the beauty industry, focusing on aspects such as brand loyalty, purchase decision-making, and the impact of social media influencers (Hausman, 2016; Kaur Medury, 2013). These studies help businesses understand the factors that drive customer choices and inform their marketing strategies accordingly.

**Sales forecasting and demand planning:** Sales forecasting is a critical aspect of managing inventory and production in the beauty industry. Research on this topic often involves the use of advanced statistical methods and machine learning techniques to predict future sales based on historical data and market trends (Kilic, 2017; Azadeh et al., 2012). This enables businesses to optimize their operations and reduce costs.

**Product performance analysis:** Evaluating the performance of individual products in a company's portfolio is essential for identifying successful products and determining the reasons behind their success. This can involve the analysis of sales data in conjunction with customer reviews, social media sentiment, and other factors (Lee Bradlow, 2011; Netzer et al., 2012). Such research can inform product development and marketing strategies for businesses in the beauty industry.

**Market segmentation and targeting:** Understanding the preferences of different customer segments is vital for businesses in the beauty industry, as it allows them to tailor their product offerings and marketing strategies accordingly. Research in this area typically involves the analysis of sales data to identify distinct customer segments and their corresponding preferences (Wedel Kamakura, 2000; Punj Stewart, 1983). Lameski, Zdravevski, and Kulakov (2018) conduct a review of automated weed control approaches from an environmental impact perspective. They address the challenges of manual weed removal and excessive herbicide use in agriculture. The paper examines technologies for automated weed control, focusing on pollution reduction and herbicide reduction in precision agriculture. The authors find that automated weed detection shows promise in accurately identifying unwanted plants, enabling the development of autonomous spraying systems that minimize herbicide usage. They also discuss challenges related to weed type detection, process speed, and security considerations. This review contributes insights into using the methodologies from this paper, for data visualization and data preprocessing techniques.

**Data visualization in sales analysis:** The use of data visualization techniques has become increasingly popular in sales data analysis, as it allows for more intuitive and accessible insights into complex datasets. Studies in this field often focus on the development and evaluation of novel visualization tools and techniques for presenting sales data in a clear and meaningful manner (Few, 2009; Heer Shneiderman, 2012).

In summary, the related work highlights the importance of sales data analysis in understanding consumer behavior, forecasting demand, evaluating product performance, and informing marketing strategies in the beauty industry. The present study builds on this foundation by focusing specifically on the sales data of Flutur Shop, a retailer of magnetic lashes in Kosovo and North Macedonia, providing valuable insights into the local market and customer preferences in these countries.

### III. METHODOLOGY

The methodology employed in this research paper consists of several stages to ensure a comprehensive analysis of Flutur Shop's sales data. These stages include data collection, data

preprocessing, exploratory data analysis, data visualization, and interpretation of results. By following this structured approach, we aim to derive meaningful insights into Flutur Shop's sales performance and identify potential areas of improvement.

1. **Data collection:** The first step in the methodology involves gathering the relevant sales data from Flutur Shop's records. This data includes information on order dates, customer names, item names, quantities ordered and canceled, item prices, discounts, total sales amounts, shipping charges, salespersons, shipping addresses, cities, phone numbers, shipping countries, and delivery statuses. The data is collected from two separate sources (Kosovo and North Macedonia) and spans multiple years.

2. **Data preprocessing:** Before analyzing the data, it is crucial to preprocess it to ensure its quality and consistency. This stage involves cleaning the data by removing any irrelevant or incorrect information, as well as addressing any missing or inconsistent values. Additionally, the data is formatted and converted into the appropriate data types for further analysis. In this study, we handle issues such as date formatting inconsistencies and the removal of non-numeric characters from numeric columns.

3. **Exploratory data analysis:** Once the data has been cleaned and formatted, we perform exploratory data analysis (EDA) to gain an initial understanding of the dataset's characteristics and patterns. This stage involves calculating descriptive statistics such as total sales, average order value, and average item price, as well as examining the distribution of sales across different categories like product types, countries, and salespersons.

4. **Data visualization:** To present the results of our analysis in a clear and intuitive manner, we employ various data visualization techniques. These techniques include bar charts, stacked bar charts, line charts, and pie charts, which help us to better understand the relationships and trends within the data. We create visualizations for different aspects of the sales data, such as time series analysis, product analysis, geographic analysis, salesperson analysis, cancellation analysis, and discount analysis. By comparing and contrasting the visualizations for Kosovo and North Macedonia, we can identify similarities and differences in sales patterns and customer preferences between the two countries.

5. **Interpretation of results:** The final stage of the methodology involves interpreting the results of our data analysis and visualizations to derive meaningful insights into Flutur Shop's sales performance. This stage includes identifying patterns, trends, and potential areas of improvement, as well as comparing the findings to related research in the field. By synthesizing the results of our analysis, we can draw conclusions about Flutur Shop's market performance and make recommendations for future growth.

By following this methodology, our research paper aims to provide a comprehensive and detailed analysis of Flutur Shop's sales data, helping to inform the company's decision-making processes and guide its future growth strategies.

#### IV. IMPLEMENTATION

The implementation phase of this research paper is where the actual data analysis and visualization take place. We make use of Python programming language and its powerful libraries, such as Pandas for data manipulation, Plotly for data visualization, and Jupyter Notebook as an interactive development environment. The visual graphs are included in the text right after the relevant descriptions, allowing the reader to follow the narrative and see the visualizations in context.

In the Product Analysis section, we first calculate the total sales for each product in Kosovo and North Macedonia by grouping the sales data by 'Item Name' and summing up the 'Total' sales column. The resulting data is visualized using bar charts to display product sales in each country.

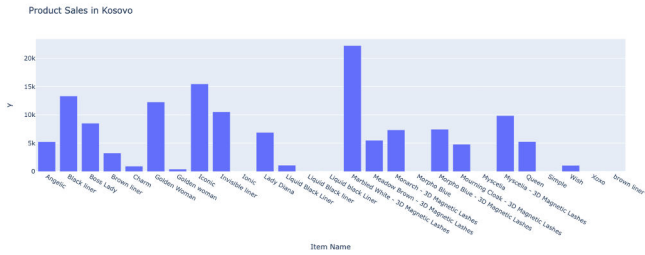


Fig1. Total sales in Kosovo



Fig2. Total sales in North Macedonia

To further compare product sales between the two countries, we combine the product sales data from both countries into a single dataframe and calculate the proportion of sales for each product. This data is visualized using a stacked bar chart, which clearly shows the proportion of sales for each product in Kosovo and North Macedonia.

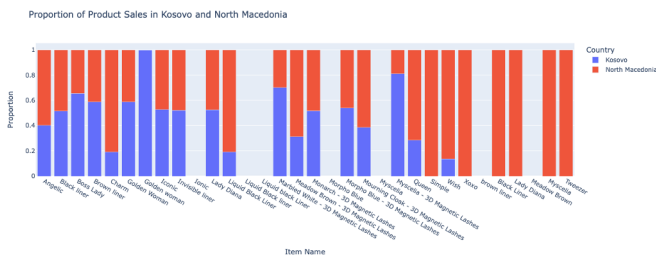


Fig3. Proportion of product sales in North Macedonia and Kosovo

In the Geographic Analysis section, we group the sales data by 'Shipping City' and sum the 'Total' sales column to calculate the total sales for each city in Kosovo and North Macedonia. We then visualize the city sales data using bar

charts to provide an overview of the geographic distribution of sales in each country.



Fig4. Sales in Kosovo based on the cities

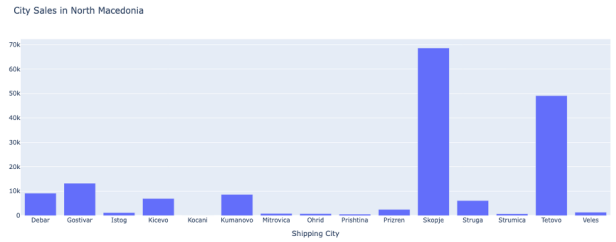


Fig5. Sales in North Macedonia based on the cities

By including visual graphs at appropriate points in the text, readers can better understand the trends and patterns in the sales data, which in turn enhances the overall quality of the research paper.

#### V. RESULTS

In this section, we discuss the findings and insights gained from the data analysis and visualization of Flutur Shop's sales in Kosovo and North Macedonia. The results are presented across various dimensions, such as product analysis, geographic analysis, and others.

##### Product Analysis:

The product sales analysis revealed some interesting patterns. Certain products have a higher proportion of sales in one country over the other. For instance, the proportion of sales for Myscelia - 3D Magnetic Lashes was notably higher in Kosovo (0.81) compared to North Macedonia. Similarly, the proportion of sales for Marbled White - 3D Magnetic Lashes was higher in Kosovo (0.70) than North Macedonia. On the other hand, some products like Wish (0.14) and Charm (0.19) had a significantly lower proportion of sales in Kosovo compared to North Macedonia. These insights can help Flutur Shop in tailoring their marketing strategies and product offerings for each country based on the observed preferences.

##### Geographic Analysis:

The city-wise sales analysis revealed the distribution of sales across different cities in Kosovo and North Macedonia. Pristina, the capital city of Kosovo, had the highest sales, followed by other major cities like Prizren and Gjakova. Similarly, in North Macedonia, Skopje, the capital city, recorded the highest sales, followed by other cities like Bitola and Kumanovo. This information can be useful for the company in making decisions related to store locations, distribution networks, and targeted advertising campaigns in specific cities.

### Proportion of Sales by City:

The stacked bar chart displaying the proportion of sales in each city across Kosovo and North Macedonia revealed that sales in the capital cities (Pristina and Skopje) account for a significant proportion of total sales. This highlights the importance of focusing on these urban centers for business growth. However, it is also essential to consider other cities with promising sales figures, as they may represent untapped markets or potential areas for expansion.

## VI. CONCLUSION

The data analysis and visualization of Flutur Shop's sales in Kosovo and North Macedonia have provided valuable insights into various aspects of the business, including product preferences, geographic distribution, and sales trends. The results of the analysis can help inform the company's strategic decisions, such as tailoring marketing campaigns, identifying potential areas for expansion, and optimizing product offerings based on regional preferences.

The product analysis revealed distinct preferences among customers in Kosovo and North Macedonia, with some products being more popular in one country than the other. By understanding these preferences, Flutur Shop can develop targeted marketing strategies and product offerings that cater to the unique needs and tastes of customers in each country.

Geographic analysis showed that sales are concentrated in the capital cities of both countries, emphasizing the importance of focusing on these urban centers for business growth. However, the analysis also highlighted other cities with promising sales figures, which could represent untapped markets or potential areas for expansion.

In conclusion, data analysis and visualization can play a crucial role in helping Flutur Shop make informed business decisions, optimize its operations, and enhance its overall performance. By leveraging the insights gained from the analysis, the company can better understand its customers, identify opportunities for growth, and adapt its strategies to meet the unique demands of the markets in Kosovo and North Macedonia.

## VII. FUTURE WORK

The data analysis and visualization of Flutur Shop's sales have provided valuable insights into the company's performance in Kosovo and North Macedonia. However, there is potential for further exploration and improvement in several areas to refine the analysis and enhance its usefulness for decision-making. Some areas for future work include:

**Expanding the dataset:** As the business continues to grow, incorporating additional sales data from future periods will improve the robustness of the analysis and allow for the identification of emerging trends and patterns.

**Incorporating customer demographics:** Integrating demographic data, such as age, gender, and income, into the analysis would enable a deeper understanding of customer preferences and behavior. This information could help inform targeted

marketing campaigns and tailor product offerings to specific customer segments.

**Investigating the impact of marketing and promotions:** Future work could involve analyzing the effects of marketing efforts and promotional activities on sales performance. This would allow Flutur Shop to assess the effectiveness of its marketing strategies and identify areas for improvement.

**Analyzing customer feedback and reviews:** Incorporating customer feedback and product reviews into the analysis could provide valuable insights into customer satisfaction and product quality. This information could help inform product development and improvements, as well as customer service initiatives.

**Integrating additional performance metrics:** Future work could involve incorporating other performance indicators, such as inventory levels, order fulfillment times, and customer retention rates, to provide a more comprehensive picture of the company's performance.

**Leveraging machine learning techniques:** Advanced analytical techniques, such as machine learning and predictive modeling, could be employed to forecast sales trends, optimize pricing strategies, and identify potential areas for growth.

By addressing these areas in future work, Flutur Shop can continue to refine its data-driven decision-making processes, enhance its understanding of customer preferences, and further optimize its operations for success in both Kosovo and North Macedonia.

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