

ANALYZING SMALL BUSINESS SALES PATTERNS USING SOFA ANOVA AND TREND CHARTS

1. Overview

Client:

A boutique retail store based in the United Kingdom, specializing in seasonal home décor and artisan gifts

Objective:

To analyze historical monthly sales data to determine which seasons and product categories drove revenue. The purpose was to optimize inventory restocking and promotional planning based on data insights using SOFA Statistics.

2. Background

The client had collected monthly sales figures over a two-year period but lacked a structured analysis of trends. Their goal was to identify statistically significant seasonal peaks and understand product performance over time using SOFA's accessible statistical tools.

3. Data Summary

Dataset:

Monthly transaction records from January 2022 to December 2023 (24 months)

Key Variables:

Variable	Type	Description
Month	Categorical	Jan to Dec
Year	Categorical	2022, 2023
Total_Sales_GBP	Continuous	Gross revenue per month
Category	Categorical	Home Decor, Candles, Stationery, Seasonal Gifts
Units_Sold	Continuous	Number of items sold
Promotions_Ran	Binary	Yes / No

4. Methodology

Software Used:

SOFA Statistics (v1.5.3)

Statistical Workflow:

1. Data Cleaning:

- Imported Excel file into SOFA
- Grouped months into seasons: Winter, Spring, Summer, Autumn
- Verified numerical formatting and cleaned category labels

2. Exploratory Analysis:

- Used **Descriptives** to explore average sales by category
- Generated time trend charts with monthly revenue
- Produced bar charts for seasonal breakdown

3. Inferential Statistics (ANOVA):

- One-way ANOVA: Total_Sales_GBP by Season
- Checked group means and homogeneity of variances
- Post-hoc testing (Tukey-like adjustment using grouped visual output)

5. Key Results

Comparison	Average Sales	p-value	Interpretation
Autumn vs. Summer	+£3,100	<0.01	Autumn outperformed Summer significantly
Winter vs. Other Seasons	Highest avg (£9,200)	<0.001	Winter (Nov–Dec) peak driven by holiday sales
Promotions Effect	+18% sales	—	Months with promotions saw consistently higher sales

Category Insight:

- Seasonal Gifts accounted for over 40% of Q4 revenue

- Home Decor peaked in Spring, Stationery remained stable year-round

6. Visual Outputs (via SOFA):

- Line chart: Monthly total sales over 24 months
- Boxplot: Sales by season
- Grouped bar chart: Category performance across quarters
- Crosstab output: Category × Promotions with row % of sales

7. Deliverables

- SOFA .db file with full dataset and charts
- Analytical report (10 pages), including:
 - Monthly and seasonal trends
 - Sales comparisons and statistical interpretations
 - Inventory planning recommendations
- Visual sales summary (2-slide PDF):
 - Seasonal demand forecast
 - Category-based revenue contribution

8. Application & Outcome

- Client aligned major promotions with the start of Autumn and Winter
- Restocking shifted from monthly to seasonal strategy
- 15% inventory cost reduction observed by minimizing overstock in low-demand months

9. Strategic Value Delivered

- Enabled **data-backed seasonal inventory strategy**
- Identified **holiday sales concentration zones**
- Demonstrated **SOFA as a cost-free yet effective tool** for business analytics