

Voice of Market (VoM) Analysis

Mustafa Bhavanagarwala, Hrishikesh Dhole, Lakshit Gupta, Priyal Joshi, Tejaswi Neelapu MASTER OF SCIENCE IN DATA SCIENCE 25.4 | Faculty Advisor Dr. Elio Zhang



PROJECT ABSTRACT

Project Sponsor

Costco Wholesale is a global membership-based retail organization committed to delivering highquality products and services at the lowest possible prices. We extend our sincere thanks and appreciation to Prakash Bhandi and Xuan Zhang, sponsor liaison at Costco Wholesale, for their support and guidance throughout the project.

Problem Statement

Costco is increasingly mentioned across a wide range of public online platforms, including product reviews, forums, and social media. However, these customer voices are fragmented, unstructured, and not systematically analyzed. This lack of centralized sentiment tracking presents challenges for Costco's efforts in understanding customer needs, identifying service pain points, and maintaining brand excellence.

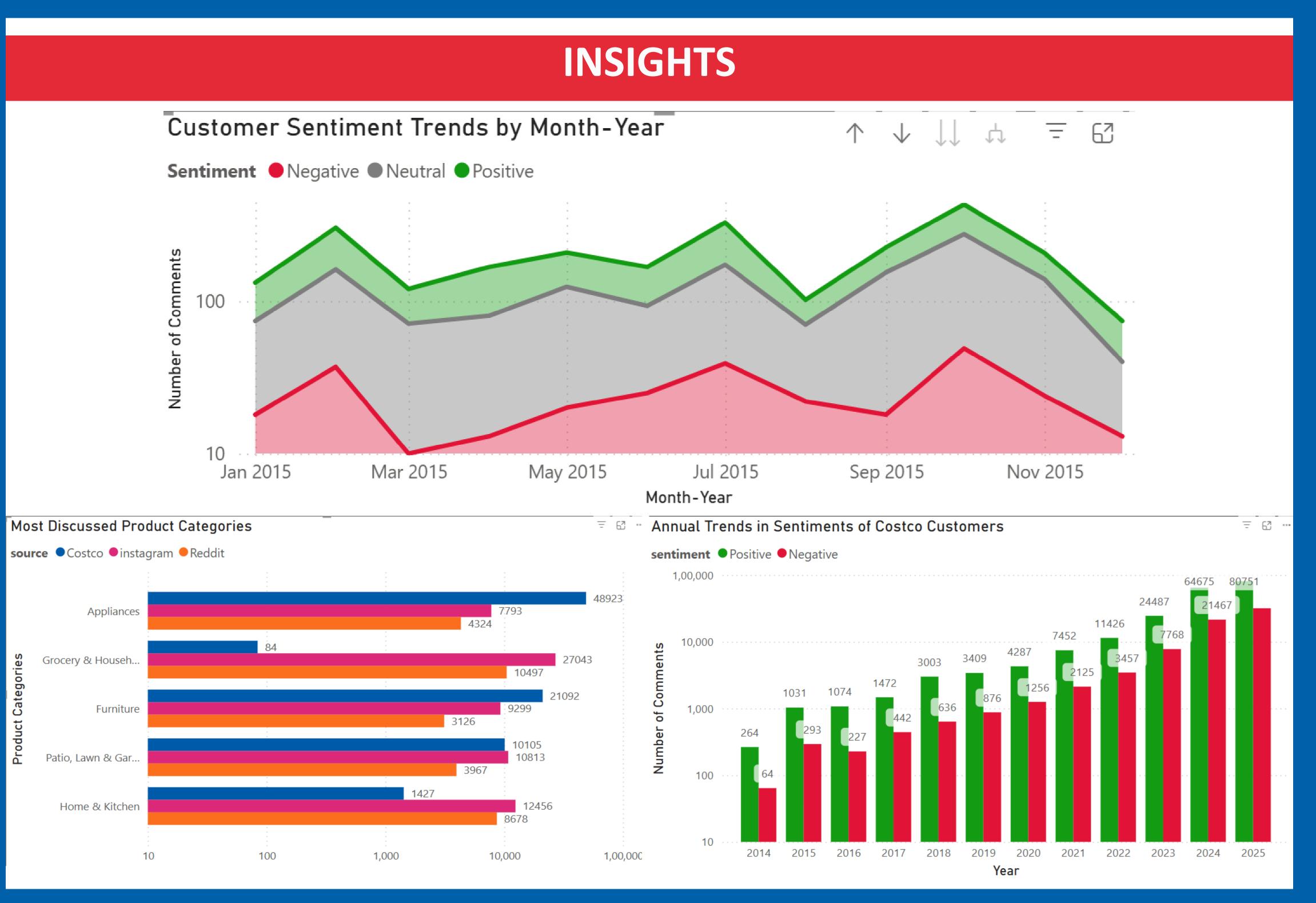
Project Solution

This project bridges the gap in customer sentiment insights. It consolidates unstructured feedback from multiple platforms into a single, analyzable dataset. Using natural language processing, sentiment analysis, and visual dashboards, we provide Costco with actionable insights into public perception. The goal is to empower decisionmakers with real-time feedback loops that inform product strategy, service improvements, and customer engagement.

PROJECT OBJECTIVES

- **Collect customer comments from** multiple public platforms: Reddit, Costco.com, Sitejabber, Twitter, and Instagram
- (S) Extract sentiment, topics, and product mentions using NLP
- (S) Create dashboards to visualize trends and themes over time
- **Enable Costco teams** to monitor, explore, and act on evolving customer feedback

METHODOLOGY Extracted comments and reviews from social media platforms using tools such as **Data Collection** BeautifulSoup, Selenium, Scrapy, as well as APIs and Chrome extensions. Applied VADER and BERT-based models to score comment polarity, validated with **Sentiment Analysis** a small human-labeled set. Used LDA to uncover key discussion themes such as food quality, membership **Topic Modeling** issues, and services like the optical center. Analyzed sentiment shifts over time, identifying spikes around COVID and **Trend Detection** seasonal events. Combined multiple NLP tools to generate context-aware insights for marketing, **Modeling Insights** service, and product teams.



KEY FINDINGS

Top 5 Product Categories

2 Appliances

3 TVs

4 Furniture

5 Health & Personal Care

6 0 **6**

Coscto



Top Products

Rotisserie chicken, optical services, Kirkland batteries were praised frequently

Platform Strengths

Reddit posts contained the most detailed feedback; Sitejabber skewed negative

Pain Points

Delivery delays, return process frustration, membership renewal confusion

Sentiment Trends

Positive sentiment dominant overall; ~15% of comments were neutral, ~25% negative

Seasonal Patterns

Holiday season spikes in comments about delivery and product availability

PROJECT IMPACT



Enables scalable public sentiment monitoring for Costco



Supports real-time customer experience



Identifies key drivers of brand reputation and concerns



Lays groundwork for alerting, chatbot training, and marketing strategy