

Optimizing Marketing Strategy through Customer Engagement and Sentiment Analysis

Abstract

This project analyzes the marketing performance of ShopEasy, an E-Commerce retail business facing declining customer engagement and conversion rates despite high marketing spend. By examining customer feedback, campaign data, and engagement metrics, the analysis uncovers critical gaps in current strategies. Key insights are provided to enhance content effectiveness, optimize the conversion rates, and improve customer satisfaction. The objective is to drive data-informed decisions that boost marketing ROI and support sustainable business growth through targeted, customer-centric strategies.

Introduction

ShopEasy, a growing online retail business, has recently faced significant challenges in its digital marketing performance. Despite launching multiple online campaigns and increasing marketing expenditures, the company has observed a noticeable decline in customer engagement and conversion rates. These issues signal a disconnect between marketing efforts and customer expectations, highlighting the need for a data-driven strategy to diagnose and resolve the problem. This project aims to analyze ShopEasy's marketing data including campaign performance, customer reviews, and engagement metrics to uncover the root causes behind the underperformance. By leveraging marketing analytics techniques, the goal is to provide actionable insights that will help ShopEasy optimize its content, better understand customer sentiment, and ultimately improve conversion rates. This analysis not only addresses immediate business concerns but also sets a foundation for long-term strategic improvements. Through this project, we aim to transform raw data into meaningful intelligence that drives effective marketing decisions and business growth.

Data Overview

To address ShopEasy's declining engagement and conversion rates, a comprehensive set of datasets was analyzed, covering customer behavior, product feedback, and marketing interaction metrics. The analysis incorporated the following key data sources:

- **Customer Data** : Contains demographic and behavioral information about ShopEasy's users, including user ID, location, and registration details.
- **Customer Journey Data** : Tracks each customer's interactions across the conversion funnel, helping to identify where drop-offs occur.
- **Engagement Metrics** : Includes performance data on marketing content—such as clicks, likes, and impressions—critical for assessing campaign effectiveness.
- **Product Information** : Provides details about items listed on ShopEasy, used to correlate product-level insights with customer feedback and conversion rates.

- **Customer Reviews and Sentiment Scores** : Contains user-submitted product reviews, used to extract sentiment and identify common praise or complaints. Pre-processed sentiment analysis results quantifying customer sentiment into positive, neutral, or negative categories.

Tools & Methodology

This project followed a structured, data-driven approach using a combination of SQL, Python, and Power BI to derive meaningful insights and build a comprehensive marketing analytics dashboard for ShopEasy. The methodology consisted of the following key stages:

1. **Data Storage and Integration:**

The project began with creating a PostgreSQL database to serve as the central repository. Five distinct datasets customers, customer journey, product details, engagement metrics, and customer reviews were imported into relational tables within the PostgreSQL environment for efficient storage and query-based analysis.

2. **Sentiment Analysis Using Python:**

Jupyter Notebook was used to perform sentiment analysis on customer reviews. A PostgreSQL connection was established using Python libraries to fetch the review data. Natural language processing techniques were then applied to classify reviews into positive, neutral, and negative sentiments. Visualizations such as pie charts and scatter plots were generated to explore sentiment distribution and highlight key patterns in customer feedback.

3. **Exploratory Data Analysis (EDA):**

EDA was conducted using Python to identify trends and sentiment proportions. This included visual summaries of sentiment categories and their relationship with review counts and ratings, providing insights into customer satisfaction.

4. **Interactive Dashboard Development in Power BI:**

The final phase involved creating a dynamic dashboard in Power BI. Data from the PostgreSQL database and sentiment analysis outputs were integrated to build visual reports. Key performance indicators such as conversion rate, customer engagement, and sentiment trends were presented through cards, charts, and filters to enable data-driven decision-making.

PostgreSQL

- **Version** : PostgreSQL 16 , Windows 11
- **Description:** PostgreSQL is a powerful, open-source object-relational database system known for its reliability, feature robustness, and standards compliance.

Jupyter Notebook

- **Version** : JupyterLab 4.0 / Notebook 7.1 (Latest release in 2025)
- **Python Version:** Python 3.11
- **Description:** Jupyter Notebook provides an interactive environment for writing and running code, visualizing data, and documenting analysis.

Power BI Desktop

- **Version** : Power BI Desktop May 2025 Update (Version 2.128.x)
- **Description**: Power BI is a business analytics tool that enables data transformation, modeling, and rich interactive visualizations.

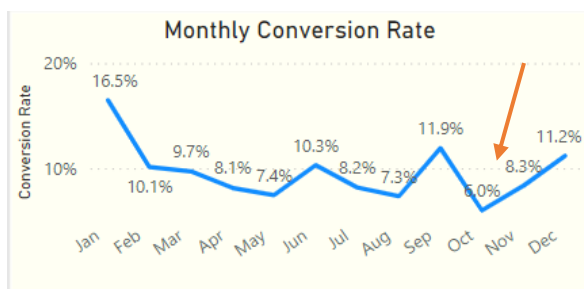
Data Analysis & Insights

From Marketing team I have got the message that our company is facing reduced customer engagement and conversion rates despite launching several new online marketing campaigns. They are reached to me to conduct a detailed analysis and identify areas for improvement in their marketing strategies.

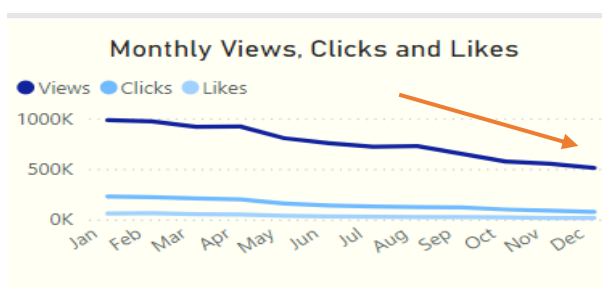
The problems they mentioned that Reduced Customer Engagement , Decreased Conversion Rates, High Marketing Expenses. They also want a details customer feedback analysis and fetch out their sentiment and categories them .

From the first Overview ,

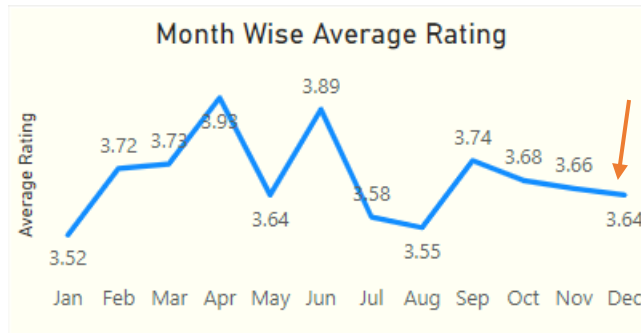
Decreased Conversion Rates : Despite a significant drop in October, the conversion rate showed a strong recovery in December, climbing to **10.2%**. This rebound highlights the potential effectiveness of recent marketing interventions and signals a positive trend following earlier declines in performance, especially during the mid-to-late months of the year.



Reduced Customer Engagement: Customer engagement has been observed across social media platforms, marked by a steady decline in views throughout the year. Although the volume of clicks and likes remains relatively low when compared to total views, the click-through rate (CTR) stands at a notable **15.37%**. This suggests that while overall reach and visibility may have decreased, the users who do engage with the content tend to do so meaningfully. These engaged users are likely more targeted or genuinely interested, indicating that the current content resonates with a specific audience.



Customer Feedback : Customer feedback analysis reveals that ratings have remained relatively consistent over the year, with an average score of around **3.7**. While this indicates general satisfaction among customers, the average falls short of the target rating of **4.0**, highlighting room for improvement. A closer look shows that certain products consistently receive ratings below **3.5**, suggesting these may be contributing to the overall lower average.



Next brief analysis of Conversion , Customer engagement , Customer feedback

Conversion Rate Analysis : Throughout the year, conversion rates fluctuated, with notable peaks in January and September, when several products performed exceptionally well. These seasonal trends suggest opportunities to boost conversions during slower months through strategic marketing efforts and targeted interventions.

Lowest Conversion Month: October recorded the lowest overall conversion rate at just 6.0% with no standout products. This highlights the need to reassess marketing strategies and promotional campaigns during this period to enhance performance.

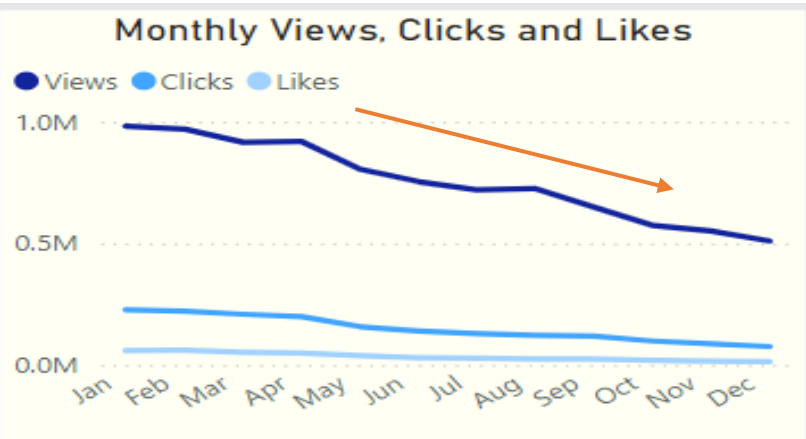
Highest Conversion Month: January achieved the highest conversion rate of 16.5%, largely driven by Ski Boots, which reached an impressive 100% conversion reflecting strong seasonal demand and effective marketing execution.

productname	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Basketball		50.0%	16.7%	20.0%					12.5%		12.5%	33.3%
Boxing Gloves	8.3%					9.1%	8.3%	11.1%		11.1%	20.0%	28.6%
Climbing Rope	11.1%	20.0%	28.6%	12.5%	6.7%	12.5%	14.3%	14.3%	7.7%	9.1%		
Cycling Helmet		28.6%	20.0%	30.0%	16.7%	8.3%		14.3%	10.0%	8.3%		
Dumbbells			16.7%	12.5%		40.0%			10.0%	9.1%	20.0%	8.3%
Fitness Tracker	16.7%		10.0%		8.3%	33.3%			16.7%		7.7%	14.3%
Football Helmet	20.0%	28.6%	7.7%	14.3%			8.3%	11.1%	10.0%			
Golf Clubs	11.1%	11.1%		10.0%	14.3%		15.4%	25.0%	12.5%			10.0%
Hockey Stick	18.2%	40.0%	11.1%		22.2%		12.5%	9.1%	20.0%		14.3%	57.1%
Ice Skates			12.5%			8.3%	30.0%	16.7%	20.0%	11.1%	18.2%	25.0%
Kayak		16.7%	20.0%	16.7%		16.7%	11.1%		10.0%	14.3%		16.7%
Running Shoes	12.5%	8.3%		10.0%	10.0%				20.0%		14.3%	
Ski Boots	100.0%	10.0%	16.7%	12.5%	11.1%	10.0%	12.5%	40.0%				
Soccer Ball	75.0%		8.3%	9.1%				10.0%	12.5%		9.1%	
Surfboard	33.3%	8.3%	10.0%	11.1%	150.0%	14.3%			11.1%	10.0%		
Swim Goggles	20.0%							14.3%	14.3%			33.3%
Tennis Racket	33.3%	7.7%	25.0%	12.5%	25.0%	11.1%			25.0%	6.7%	20.0%	
Volleyball	18.2%			11.1%		33.3%		10.0%				12.5%
Yoga Mat	40.0%	12.5%	11.1%			14.3%	30.8%					16.7%

Declining Views: Audience views peaked in February and July but showed a noticeable decline from August onward, indicating reduced engagement during the latter half of the year.

Low Interaction Rates: Despite decent viewership, clicks and likes remained consistently low, highlighting the need for more compelling content and stronger calls to action to boost interaction.

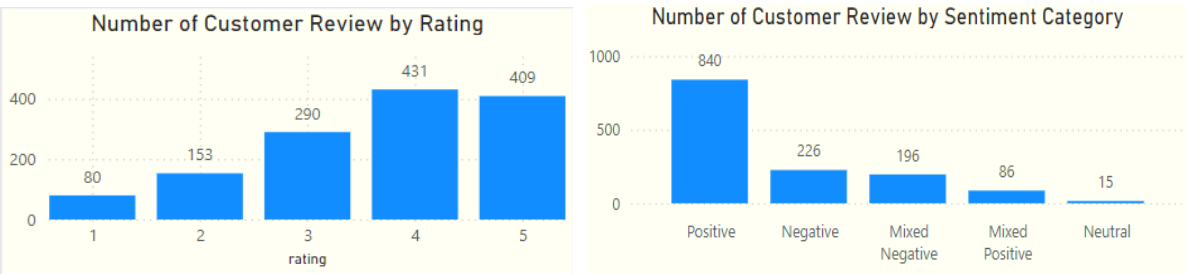
Content Type Performance: Blog posts generated the highest number of views, particularly in April and July. In contrast, social media and video content maintained steady but slightly lower levels of engagement throughout the year.



Customer Ratings Distribution: The majority of customer reviews reflect high satisfaction, with **431** reviews rated at 4 stars and **409** at 5 stars, indicating strong overall approval. Lower ratings are significantly fewer, with **80** reviews at 1 star and **153** at 2 stars. This suggests that while feedback is generally positive, there are still pockets of dissatisfaction worth addressing.

Sentiment Analysis: Sentiment analysis further confirms a largely satisfied customer base, with 840 reviews categorized as positive. Negative sentiment appears in 15 reviews, and a smaller number reflect mixed or neutral tones. This mix points to certain aspects of the customer experience that could benefit from improvement.

Opportunity for Improvement: The presence of mixed-positive and mixed-negative reviews presents a clear opportunity to enhance satisfaction. By identifying and addressing the specific concerns within these reviews, the business can potentially convert lukewarm experiences into strong endorsements and move closer to the target average rating.



Recommendations for Marketing Optimization

Increase Conversion Rates

- **Focus on High-Performing Products:** Prioritize marketing efforts on products with proven high conversion rates, such as Hockey sticks, Ski Boots, and Baseball Gloves.
- **Leverage Seasonality:** Launch targeted promotions and personalized campaigns during peak-performing months (e.g., January and September) to maximize sales.
- **Optimize Conversion Funnel:** Analyze the customer journey to identify drop-off points and implement improvements to streamline the path to purchase.

Enhance Customer Engagement

- **Revamp Content Strategy:** Introduce more engaging formats like interactive videos and user-generated content to improve viewer interaction.
- **Strengthen Call-to-Actions:** Optimize the placement and clarity of CTAs in blogs and social media posts, especially during lower engagement periods (September–December).
- **Content Performance Analysis:** Evaluate the effectiveness of different content types to refine future marketing strategies.

Improve Customer Feedback Scores

- **Address Negative and Mixed Reviews:** Establish a feedback loop to regularly analyze and respond to common concerns in less favorable reviews.
- **Follow Up with Dissatisfied Customers:** Engage with unhappy customers to resolve issues and encourage updated reviews.
- **Continuous Improvement:** Use insights from feedback to guide product enhancements and service upgrades, aiming to raise the average rating toward the 4.0 target.

Conclusion

This project focused on resolving ShopEasy's declining customer engagement and conversion rates, despite significant investments in marketing campaigns. By analyzing conversion patterns, content performance, and customer feedback, I identified critical issues and developed targeted, data-driven strategies for improvement. The project offered valuable insights into seasonal trends, content effectiveness, and customer sentiment. As a data analyst, this experience strengthened my ability to interpret complex real-world data, extract actionable insights, and align them with business objectives. It emphasized the power of data in decision-making and the vital role analytics plays in enhancing customer satisfaction and achieving measurable marketing success.

References

Marketing Strategy : <https://www.domo.com/learn/article/the-three-components-of-a-successful-marketing-analytics-strategy>

Sentiment analysis : <https://sproutsocial.com/insights/sentiment-analysis-marketing/>

Python for analysis : <https://www.geeksforgeeks.org/pandas-and-numpy-exercises-for-data-analysis/>

SQL Database create : https://www.w3schools.com/sql/sql_create_db.asp

Power BI report making : <https://interworks.com/blog/2024/07/10/how-to-build-a-report-in-power-bi-desktop/>