

E-Commerce Customer & Marketing Analytics

Industrial-Level End-to-End Data Case Study

1. Business Context

The e-commerce industry is highly competitive, with companies constantly balancing customer acquisition, retention, pricing, and profitability. While traffic growth is essential, sustainable business performance depends on improving customer lifetime value, optimizing marketing ROI, and managing pricing strategies.

The leadership team of a growing e-commerce company observed **strong website traffic but inconsistent revenue growth and wanted to move toward a more data-driven growth strategy**. The company aimed to understand:

- How marketing channels influence customer quality
- Which customer segments drive long-term revenue
- The impact of discounting on margins
- Opportunities to optimize pricing, promotions, and retention

The objective was to perform an end-to-end analytics study to generate actionable insights that support sustainable and profitable growth.

2. Business Objectives

The project was designed to answer key strategic questions:

1. Which marketing channels drive high-value customers and profitability?
 2. What factors influence conversion and repeat purchase behaviour?
 3. How do discount strategies impact revenue and margins?
 4. Which product categories contribute most to growth and profit?
 5. How can the company optimize marketing and pricing for long-term scalability?
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3. Data Overview

The analysis integrated multiple data sources to create a complete customer funnel view:

- Customer signup and demographic data
- Website traffic and session behaviour
- Marketing channel attribution
- Order and transaction history
- Product cost, category, and pricing information

This multi-source dataset enabled end-to-end visibility from customer acquisition to profitability.

4. Data Preparation and Feature Engineering

Data cleaning and preparation were performed using Excel to ensure accuracy and consistency.

Key steps included:

- Removing duplicate and inconsistent records
- Handling missing demographic and channel data
- Standardizing naming conventions across categories and sources
- Converting date fields for time-series analysis
- Detecting extreme pricing and discount outliers
- Engineering business metrics such as revenue, profit, margin, and customer segments

These steps ensured reliable downstream modelling and business decision-making.

5. SQL-Based Analytical Insights

5.1 Customer Funnel and Conversion Analysis

The first stage evaluated customer journey performance from traffic to purchase.

Key Findings

- The platform attracted approximately **1.5K visitors**, of which around **500 converted into buyers**, resulting in a **conversion rate of ~33%**, which is above typical industry benchmarks.
 - Email and Organic channels demonstrated relatively stronger conversion efficiency, while Social media contributed traffic but with comparatively lower conversion rates.
 - Conversion variability across channels indicated differences in customer intent and targeting effectiveness.
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Business Insight

High traffic alone does not guarantee revenue growth. Customer quality, targeting precision, and channel intent play a critical role in conversion.

The strong conversion rate suggests a well-optimized customer experience, but marketing efficiency varies across channels.

Business Recommendations

Focus on:

- Allocating marketing budgets toward high-intent channels such as Organic and Email.
- Improving targeting and personalization in lower-performing channels such as Social media.
- Strengthening user journey optimization through UX improvements and retargeting strategies.

This can improve both acquisition efficiency and revenue scalability.

5.2 Customer Behaviour and Retention (New vs Repeat Customers)

Customer segmentation revealed significant differences in behaviour and value.

Key Findings

- Repeat customers represented approximately **66% of the total customer base**, highlighting strong customer retention.
 - Repeat customers contributed nearly **83% of total revenue** and a majority share of profit, while new customers accounted for only **17% of revenue**.
 - Repeat customers showed higher average order values and more stable purchasing patterns.
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Business Insight

Customer retention is the primary driver of long-term profitability and sustainable growth.

This indicates that the company's current growth model relies heavily on loyal customers rather than continuous acquisition.

Business Recommendations

Focus on:

- Strengthening loyalty programs and personalized engagement strategies.
- Expanding CRM and lifecycle marketing through targeted email and push campaigns.
- Improving post-purchase experience to encourage repeat purchases.
- Using behavioural segmentation to increase customer lifetime value.

Retention-focused strategies can reduce acquisition costs and improve profitability.

5.3 Discount and Pricing Strategy

The impact of discounting on revenue and margins was evaluated to balance growth and profitability.

Key Findings

- Discount ranges between **0–10% generated the highest profitability**, with average margins above 35%.
 - Margins declined sharply as discount levels increased, with average profitability falling below 20% beyond the 20–30% range.
 - Discounts above **25–27% frequently resulted in negative profit contribution**, indicating margin erosion during aggressive promotions.
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Business Insight

While discounting drives short-term revenue growth, excessive discounting reduces profitability and may train customers to wait for promotions.

The data suggests that current discount strategies are not optimized.

Business Recommendations

Focus on:

- Setting discount thresholds and avoiding blanket high-discount campaigns.
- Implementing dynamic pricing and targeted promotions for high-value segments.
- Designing personalized offers based on customer behaviour and purchase history.
- Monitoring promotion effectiveness through margin and ROI tracking.

This approach balances customer acquisition and sustainable profitability.

5.4 Category and Product Strategy

Key Findings

- Sports and Beauty categories were the top revenue drivers, contributing a significant share of overall sales and demonstrating strong customer demand.
 - High-margin categories such as Sports delivered consistent profitability with relatively lower discount dependency.
 - No category showed sustained negative profitability, indicating an overall healthy product portfolio.
 - However, discount sensitivity varied across categories, with certain segments experiencing significant margin erosion during promotional periods.
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Business Insight

These findings indicate that a uniform pricing and promotion strategy is suboptimal. Category-level differences in price sensitivity and margin structure highlight the need for differentiated pricing and portfolio optimization.

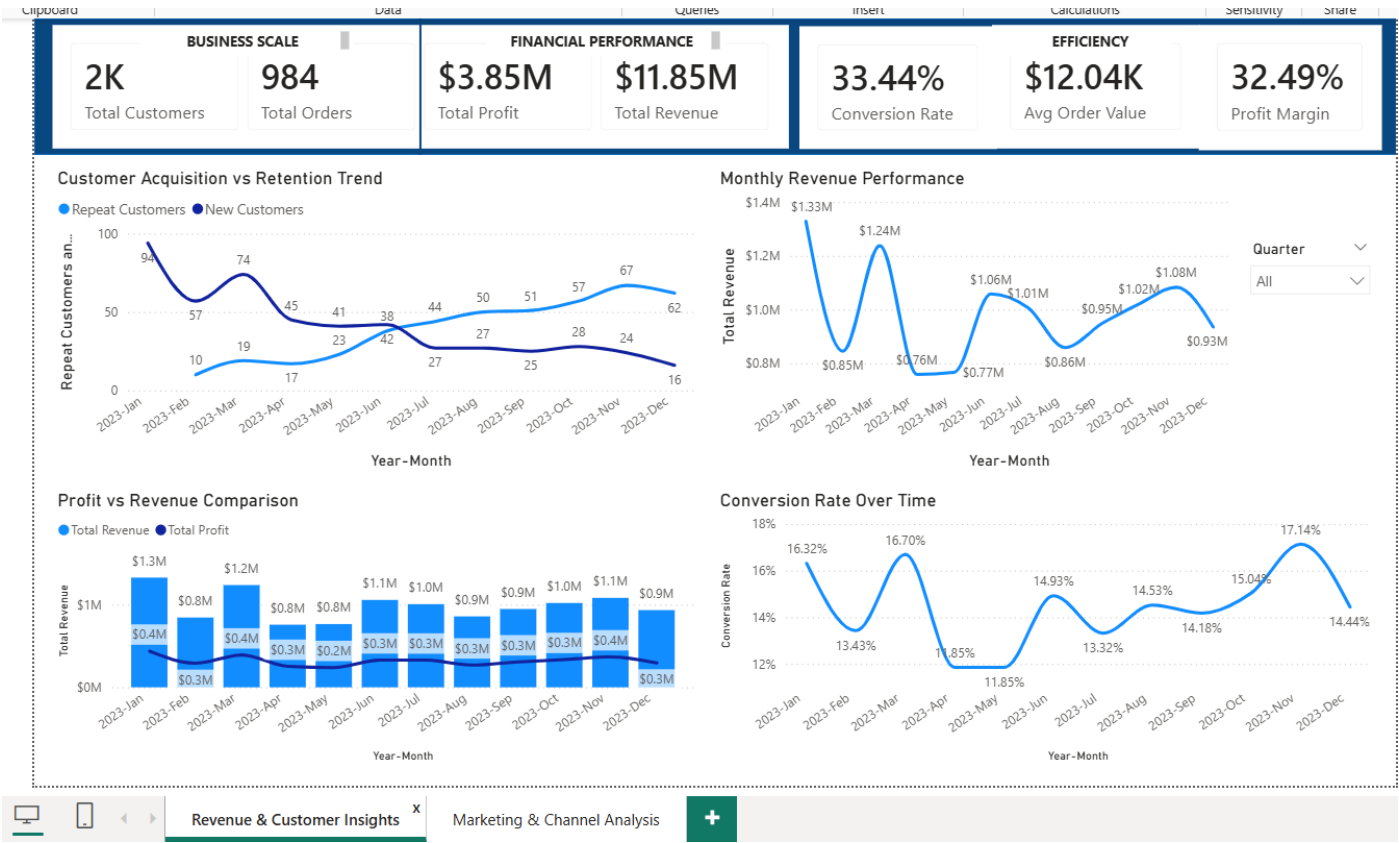
Business Recommendations

Focus on:

- Prioritizing high-margin and high-growth categories in marketing and inventory planning.
- Implementing category-specific pricing strategies based on margin elasticity.
- Designing bundled offerings to increase average order value.
- Optimizing promotional investments toward high-profit segments.

6. Power BI Dashboard and Advanced Business Insights

An interactive dashboard was developed to support decision-making across marketing, pricing, and customer strategy.



6.1 Executive Performance Overview

Key Findings

- Revenue fluctuations stabilized over time, indicating improved operational efficiency.
- Conversion trends improved in later months, suggesting better customer targeting and experience optimization.
- Profit margins remained stable despite pricing variations.
- Average order value remained consistent, reflecting pricing and product mix stability.

Business Insight

The company is transitioning toward a more stable and predictable growth model.

Business Recommendations

Focus on:

- Scaling proven marketing strategies and conversion improvements.
 - Maintaining margin discipline while optimizing customer experience.
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6.2 Customer Acquisition vs Retention

Key Findings

- New customer acquisition declined gradually over time.
 - Repeat customers increased, contributing a larger share of revenue.
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Business Insight

The business demonstrates strong retention but must sustain acquisition to maintain long-term growth.

Business Recommendations

Focus on:

- Balancing acquisition and retention investments.
 - Strengthening performance marketing for new customer growth.
 - Leveraging data-driven retention strategies.
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6.3 Marketing and Channel Performance

Key Findings

- Organic and Paid channels drove the majority of traffic, revenue, and profitability.
 - Email marketing demonstrated high conversion and retention potential.
 - Social media contributed lower traffic quality and profitability.
 - Organic customers showed higher repeat purchase behaviour.
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Business Insight

Each marketing channel plays a different role across the customer funnel. A full-funnel strategy is essential.

Business Recommendations

Focus on:

- Investing in SEO and Organic growth for long-term scalability.
- Using Paid marketing to accelerate acquisition.
- Leveraging Email for retention and lifecycle engagement.
- Optimizing Social media through targeted and performance-driven campaigns.

7. Strategic Impact

This analysis provides a roadmap to:

- Improve marketing ROI and customer quality
- Increase customer lifetime value
- Optimize pricing and promotional strategies
- Reduce margin erosion
- Strengthen sustainable and profitable growth

8. Tools and Technologies

- Excel – Data cleaning and preparation
 - SQL – Analytical modelling and business insights
 - Power BI – Interactive dashboards and decision support
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9. Conclusion

This end-to-end analysis demonstrated the importance of customer-centric, data-driven decision-making in e-commerce. By integrating traffic, customer behaviour, pricing, and profitability, the company can shift from short-term growth to sustainable long-term value creation.