



Marketing Analytics Problem Assignment Part 1

Submitted By

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Introduction

In today's data-driven marketing landscape, leveraging data analytics for strategic decision-making is crucial. This report analyzes the **4 Ps—Product, Price, Place, and Promotion**—through data analytics, focusing on how companies can use data to optimize their marketing strategies. By examining a sample dataset, we apply analytical techniques to understand customer behavior and make recommendations that can improve business outcomes.

Theoretical Component: The 4 Ps in Marketing

Product: Optimizing Product Strategy through Data Analytics

The **Product** element of the marketing mix refers to the design and development of products that meet customer needs. In the digital age, **data analytics** plays a critical role in product development, helping businesses understand customer preferences and market demand (Kotler & Keller, 2016). For example, e-commerce giants like **Amazon** use purchase behavior data to inform product recommendations, ensuring that customers are presented with relevant options based on their previous interactions.

Analytics methods such as **market basket analysis** help companies identify products often purchased together, allowing them to create product bundles. Additionally, **predictive analytics** allows businesses to forecast future demand and adjust their product offerings accordingly. These insights empower businesses to fine-tune their product strategies and enhance customer satisfaction.

Price: Data-Driven Pricing Strategies

Pricing strategies are vital for maximizing revenue while ensuring customer satisfaction. **Dynamic pricing**, which adjusts prices based on real-time demand, is a prominent application of data analytics in pricing. Companies like **Uber** use dynamic pricing models to adjust fares based on factors like traffic and weather (Chen, Mislove, & Wilson, 2015). Data analytics also supports **price segmentation**, where businesses analyze **willingness to pay** through customer data and market trends. **Conjoint analysis** is a method used to measure customer preferences for different product attributes, helping businesses set optimal prices (Kotler & Keller, 2016).

Furthermore, **competitive analysis** using real-time data helps businesses adjust their prices to remain competitive. Tools like **web scraping** can collect competitor pricing, allowing for dynamic adjustment of prices to maximize profitability.

Place: Optimizing Distribution with Geospatial Analytics

The **Place** element focuses on delivering products to customers in the most efficient way. **Geospatial analytics** allows companies to analyze customer location data and optimize their distribution strategy. For instance, **Walmart** uses geospatial data to assess the best locations for new stores based on factors such as population density and purchasing power (Nikolopoulou & Tagaras, 2017). **Route optimization** tools further ensure that products reach customers most efficiently by minimizing transportation costs.

In addition, **heat maps** generated through geospatial analysis allow businesses to visualize regions with high product demand, enabling them to allocate resources more effectively. Geospatial tools in **Excel** or **Power BI** help companies refine their distribution networks and improve inventory management.

Promotion: Measuring Campaign Effectiveness

Promotions are designed to drive sales and customer engagement. Data analytics can assess the effectiveness of promotional campaigns by analyzing metrics such as **customer engagement**, **click-through rates**, and **conversion rates**. Techniques like **A/B testing** are commonly used to compare the

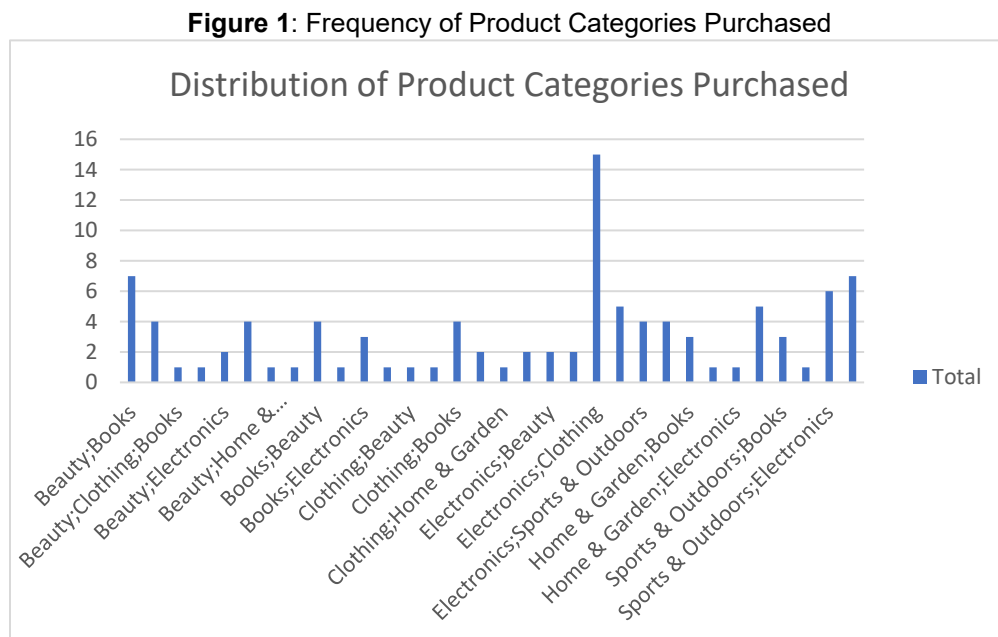
performance of different campaign versions, optimizing marketing strategies based on customer response (Chatterjee et al., 2019).

Regression analysis helps measure the impact of various factors (e.g., age, income) on campaign success. Companies can determine which variables drive engagement and adjust their strategies accordingly. **Marketing ROI** is another key metric that businesses can analyze to evaluate the return on promotional investments.

Applied Component: Using Data Analytics for the 4 Ps

Product: Analyzing Purchase Patterns

To understand which product categories are most popular, we used a **pivot table** and **bar chart** to summarize product purchases (See Product sheet on attached Excel file). As shown in **Figure 1**, **Electronics** emerged as the most frequently purchased category, with **Clothing** and **Beauty** following. This insight suggests that businesses should focus on expanding the **Electronics** range and exploring opportunities for cross-selling related products.

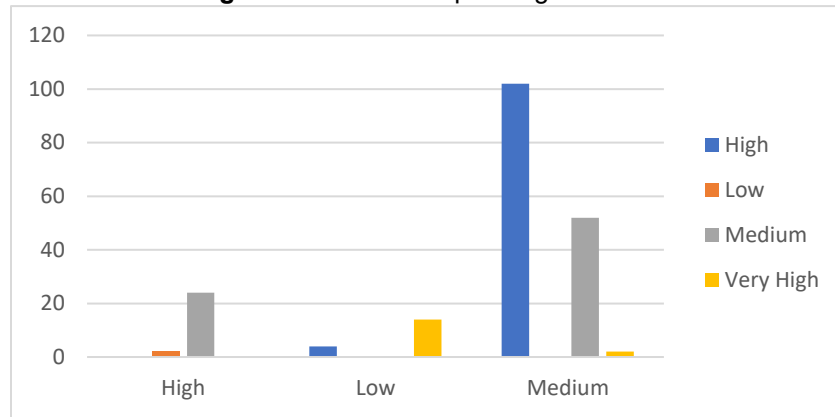


Price: Segmenting Customers by Spending Behavior

Customer segmentation was conducted based on **Annual Income** and **Spending Score**. Using the **AVERAGEIF** function in Excel (See Price sheet on attached Excel file), we analyzed the **average spending behavior** across different segments (low, medium, high). The data revealed that **low-income customers** with high spending scores showed a strong potential for **discounted luxury products**, while **high-income customers** tended to engage with **premium pricing strategies**.

The **pivot table** results indicate that **dynamic pricing** could be employed for low-income, high-spending segments to increase engagement while offering **premium options** for high-income customers. **Figure 2** displays the spending behavior segmented by income and spending score.

Figure 2: Customer Spending Behavior



Place: Identifying Geographic Trends

Although specific geographic data wasn't available in the dataset, demographic analysis suggests that **urban regions** are likely to see higher demand for **Electronics** and **Clothing**. **Heat maps** could further help visualize these trends by correlating **income levels** and **spending behavior** with geographic data (if available). Businesses could use this information to optimize inventory and improve regional distribution strategies.

Promotion: Evaluating Campaign Effectiveness

To evaluate the effectiveness of the **marketing campaign**, we analyzed **engagement with the last campaign** using the **AVERAGEIF** function and **regression analysis**. The AVERAGEIF analysis shows a higher average number of purchases by the engaged customers compared to that of the non-engaged customers, indicating the campaign's effectiveness in driving sales (See Promotion2 sheet on Excel file)

The **regression model** (Figure 3) showed that **engaged customers** had a higher number of purchases compared to non-engaged customers, confirming that the campaign had a positive impact on **customer spending** (See Promotion2 sheet on excel file).

Figure 3: Regression Analysis of Campaign Effectiveness

Regression Statistics	
Multiple R	0.981837733
R Square	0.964005334
Adjusted R Square	0.963263175
Standard Error	0.476904657
Observations	100

Conclusion

This report demonstrates the power of **data analytics** in optimizing the **4 Ps** of marketing. Through the application of techniques such as **pivot tables**, **regression analysis**, and **segmentation**, businesses can make data-driven decisions that enhance product offerings, pricing strategies, distribution efficiency, and promotional campaigns. By continually analyzing customer data, businesses can refine their strategies to stay competitive and improve customer satisfaction.

References

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