

Instacart Grocery Basket Analysis

Case Study

Introduction

Context: The Instacart stakeholders want to target different customers with applicable marketing campaigns to see whether they influence the sale of their products.

Objective: Inform what this strategy might look like to ensure Instacart targets the right customer profiles with the appropriate products

Key Questions:

- What are the busiest days of the week and hours of the day in terms of order volume?
- Are there certain types of products that are more popular than others?
- What's the distribution among users regarding their brand loyalty (i.e., how often do they return to Instacart)?
- Are there differences in ordering habits based on a customer's loyalty status?

Data:

- Instacart Open-Source dataset
- Customer and prices data set created by CareerFoundry

Tools: Python, Jupyter Notebook, Pandas, Seaborn and Matplotlib libraries, Excel.

Main Process

1. Data Preparation

The original Instacart data and the CareerFoundry-generated customer data were cleaned by checking for missing values, standardizing inconsistent data types, and removing unnecessary columns before merging the datasets. Since the research questions were defined in advance, additional variables were derived to enable the analysis.

2. Analysis

To organize the stakeholder questions, the analysis was divided into four sections: time analysis, product analysis, and customer analysis. Each section faced specific constraints, which were addressed by adapting methods to the available data.

3. Results

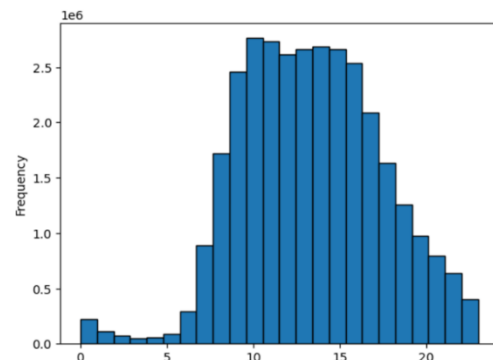
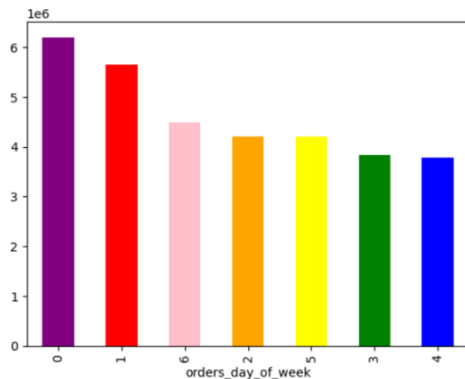
Although the analysis was based on sound methodology, the limitations of the dataset were visible across all four sections. Recommendations were provided to stakeholders together with a disclaimer highlighting the data constraints.

Time Analysis

The first step in the analysis focused on identifying when customers place the most orders. Understanding order timing helps the sales and marketing teams optimize the scheduling of promotions and advertisements.

The results show that Saturday and Sunday are the busiest days of the week, with noticeably higher order volumes compared to weekdays. In terms of daily patterns, the peak hours for orders occur between 9 a.m. and 4 p.m. Order frequency rises sharply in the morning, stays consistently high throughout midday, and then declines in the evening.

These insights matter because they help Instacart optimize marketing and operations. Ads can be scheduled during quieter periods to boost demand, while staffing and delivery capacity can be concentrated during peak hours.

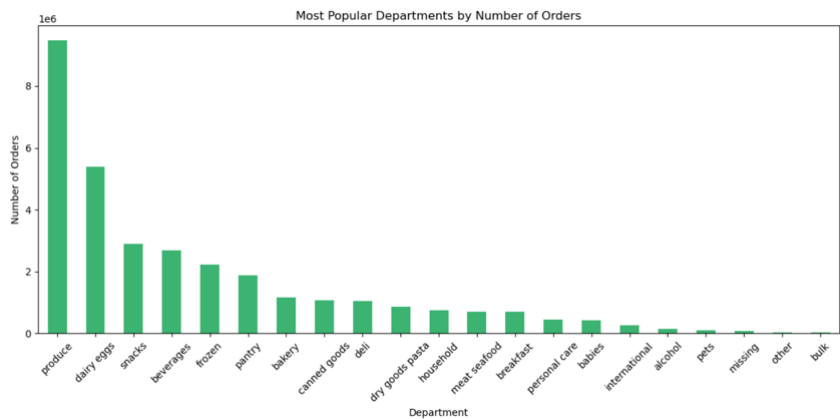


Product Analysis

This part of the analysis examined which types of products are most popular with Instacart customers. Identifying high-demand categories is important for sales and marketing teams to focus promotions on the departments that drive most orders.

The results show that produce is by far the most frequently ordered category, followed by dairy & eggs, snacks, and beverages. In contrast, categories such as alcohol, bulk items, and pet products make up only a very small share of total orders.

These insights matter because they help Instacart tailor marketing campaigns and optimize inventory. By prioritizing promotions in high-demand categories like fresh produce and dairy, Instacart can strengthen customer engagement and retention.

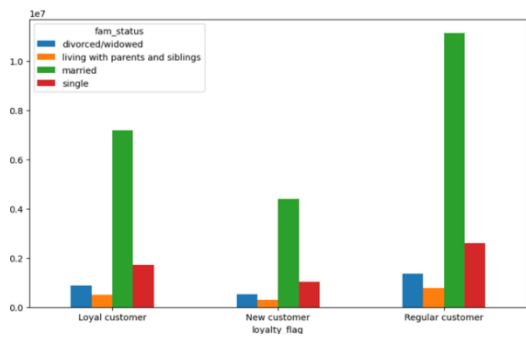
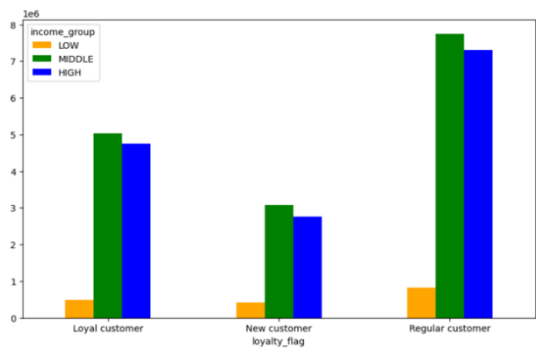


Customer Analysis

This part of the analysis explored brand loyalty among customers and how it differs across demographic groups. Understanding loyalty patterns helps the marketing team design retention strategies and tailor campaigns to different customer segments.

The results show that most users fall into the regular customer category, followed by loyal customers, with new customers making up the smallest group. When broken down by income, middle- and high-income groups dominate across all loyalty categories, while low-income customers represent only a small share. Looking at family status, married customers and single customers are the largest groups, especially among regular and loyal customers.

These findings matter because they reveal that Instacart’s core user base is middle- to high-income households, particularly married and single individuals. Marketing strategies can therefore focus on reinforcing loyalty within these groups while also developing targeted campaigns to engage underrepresented segments, such as low-income customers or households living with parents and siblings.



Conclusion

The analysis revealed clear patterns in customer behavior across time, product categories, demographics, and loyalty status. Order activity peaks during weekends and between late morning and early afternoon, showing predictable cycles in demand throughout the week and day. Product preferences are concentrated in a few departments, with Produce, Dairy and Eggs, and Snacks generating the highest order volumes.

Customer segmentation indicates that middle- and high-income groups, along with married customers, form the most consistent and loyal base, while low-income groups appear less represented across all loyalty categories. At the same time, spending habits are relatively low across loyal, regular, and new customers, suggesting opportunities to increase order values through targeted strategies.

Recommendations

Timing of promotions: Focus ads and campaigns on weekends and during peak hours (late morning to early afternoon), with additional evening offers to capture rising spending later in the day.

Product focus: Prioritize marketing and inventory around Produce, Dairy & Eggs, and Snacks, as these categories generate the highest order volumes.

Loyalty strategy: Strengthen loyalty programs for middle- and high-income married customers, the most consistent returning shoppers.

Customer targeting: Tailor product offerings and messaging primarily to middle- and high-income adults, while testing selective promotions for other groups to explore new growth opportunities.