



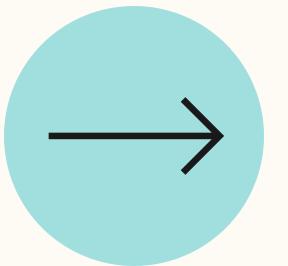
# iFood Business Case Study

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# Overview



A food company wants to get the most profit possible for its **upcoming direct marketing campaign**, scheduled for next month.

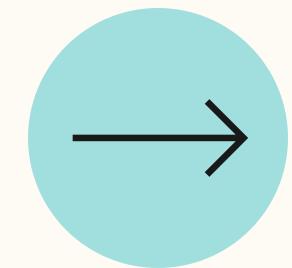
A pilot campaign was done with **2,240 customers**, who were tagged based on whether they accepted the offer. The total cost of the pilot campaign was 6,720 MU, and the revenue from customers who accepted the offer was 3,674 MU.

Overall, the campaign resulted in a loss of 3,046 MU, and the success rate was 15%.

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To make the next campaign as **profitable** as possible and understand the **characteristics of the customers** who accepted the offer, we conducted a detailed study based on data from the last 5 campaigns, customer information from the CRM, and their **historical behavior**.

# Goals

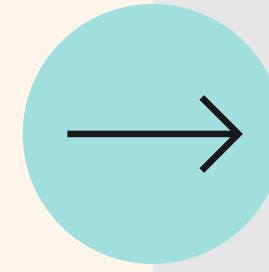


The team's goal is to develop a **model that predicts customer behavior** and apply it to the rest of the customer base. In addition to maximizing the campaign's profit, the CMO is interested in **studying the characteristics of customers willing to purchase the gadget**.

The goal is to **improve the ROI** of the next campaign through a predictive model that helps identify customers likely to accept an offer.

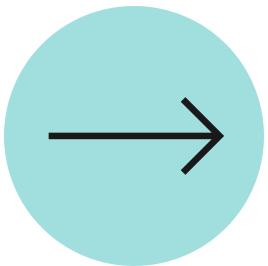
## Stages

- Overview of the campaigns
- Customer profile (Customers who accepted at least one offer vs. Customers who didn't accept any offer)
- Customer segmentation based on historical behavior
- Predictive model to improve campaign profit
- Conclusions



# Data Exploration

# Campaign Analysis



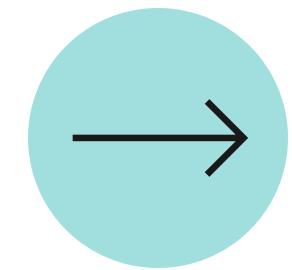
After 5 campaigns, **only 463 (20.7%)** of the 2,240 customers contacted **purchased the promotional product at least once**. A total of 667 offers were completed across all campaigns.

	<b>Campaign #1</b>	<b>Campaign #2</b>	<b>Campaign #3</b>	<b>Campaign #4</b>	<b>Campaign #5</b>
<b>Accepted Offers</b>	144	30	163	167	163
<b>% Success Rate</b>	6,43 %	1,34 %	7,28 %	7,46 %	7,28 %

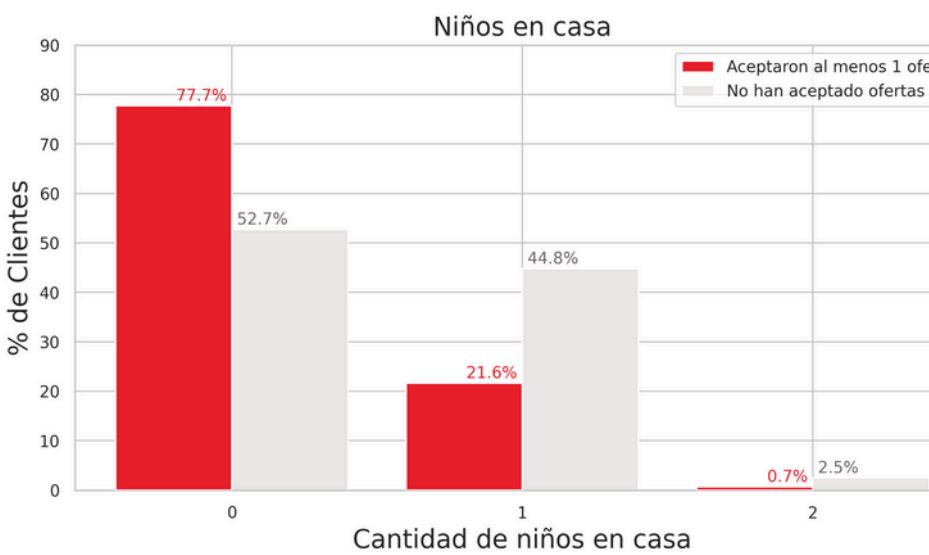
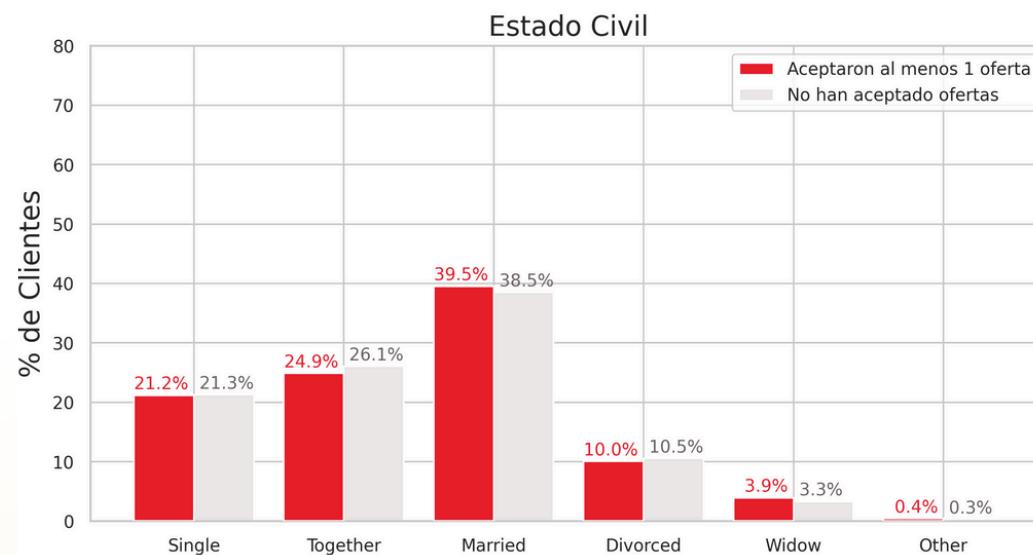
As we can see, Campaign #4 performed the best, while Campaign #2 had the worst performance. In Campaign #4, only 7.5% of the contacted customers actually purchased the gadget. This shows that it is possible to better select the customers most likely to make a purchase, in order to reduce campaign costs and improve profit.

The ROI of the campaign was -45%.

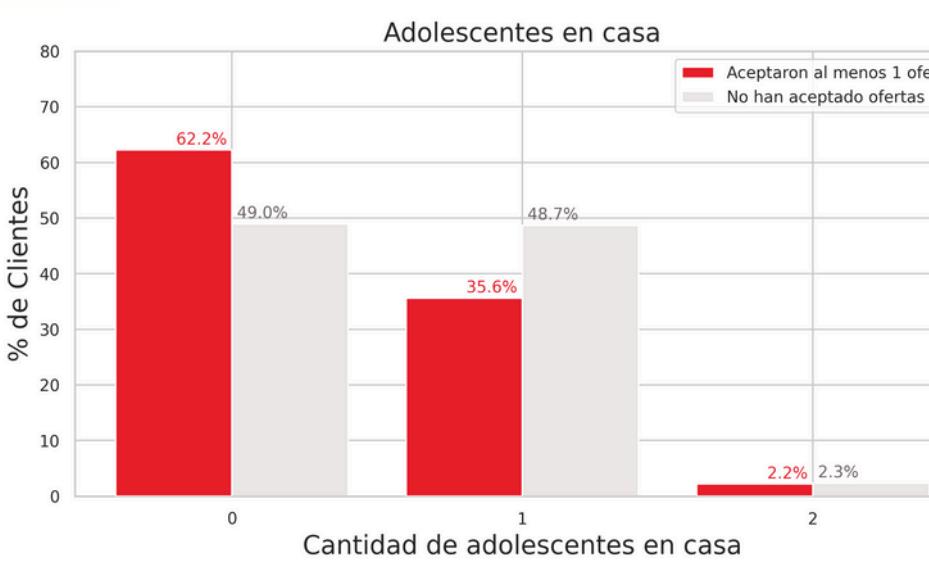
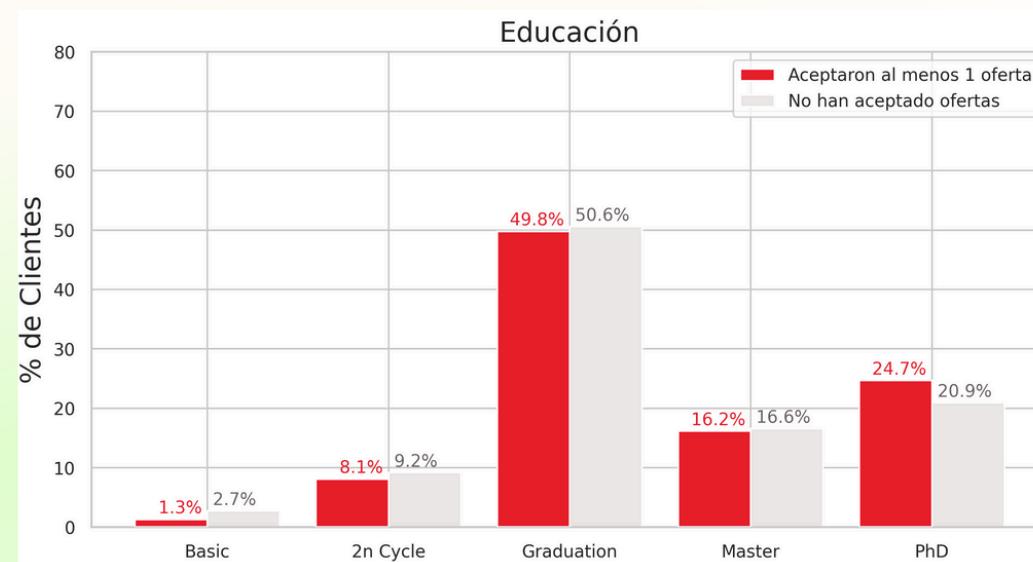
# Customer Profile



To better understand the characteristics of the customers, we divided them into two groups: **those who accepted the offer at least once** and **those who never accepted any offer**.



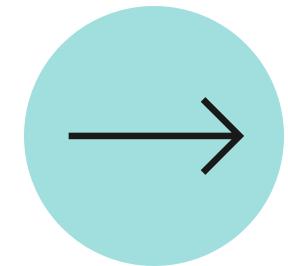
Most customers are **married** and have a **high level of education**, but there is **no clear trend in accepting or not accepting the offers**.



An interesting characteristic of the **customers who accepted the offer** is the higher proportion of customers **without children or teenagers at home**, compared to the group that did not accept the offer.

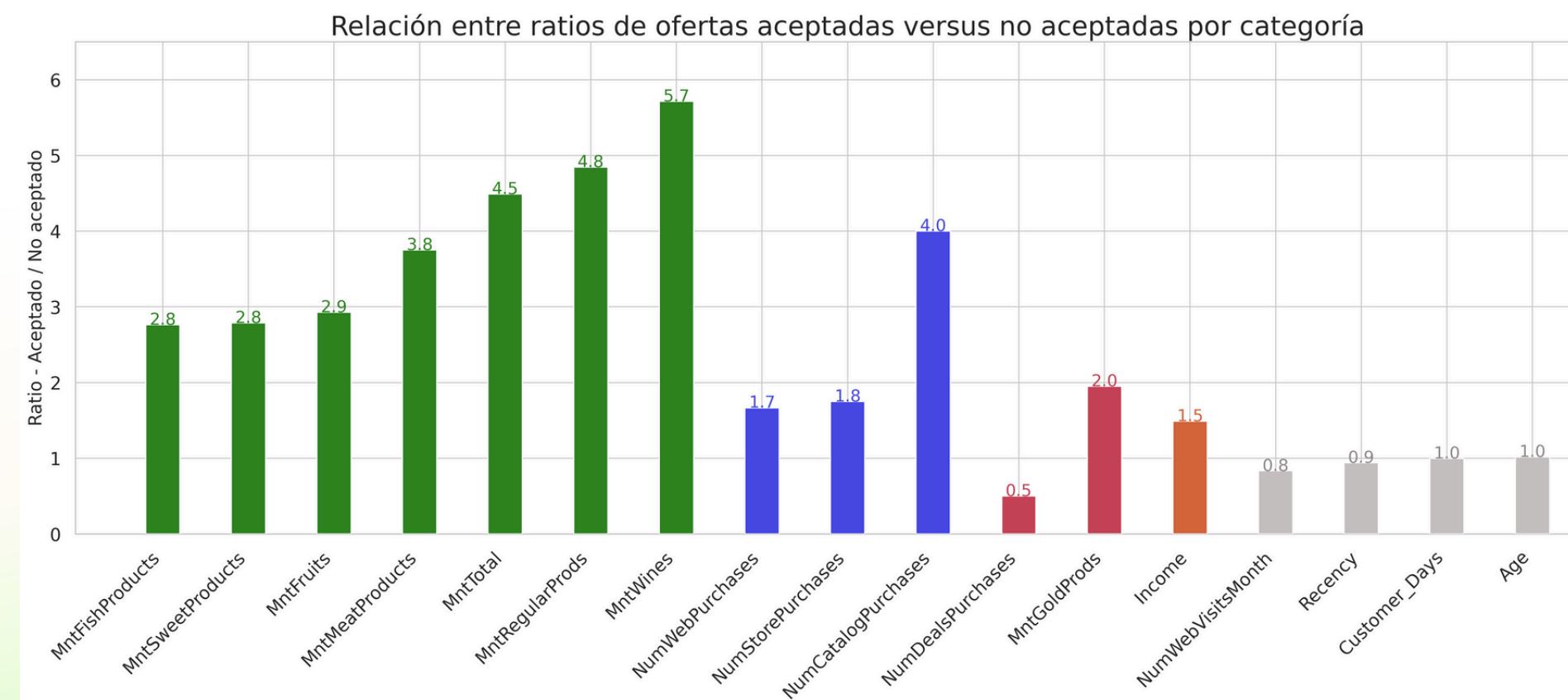
As for age, the median age of customers who accepted the offer is 55 years, with the **age distribution ranging from 28 to 83 years**.

# Customer Profile



By comparing the median values of customers who accepted at least one offer versus those who accepted no offers, we can see the following patterns:

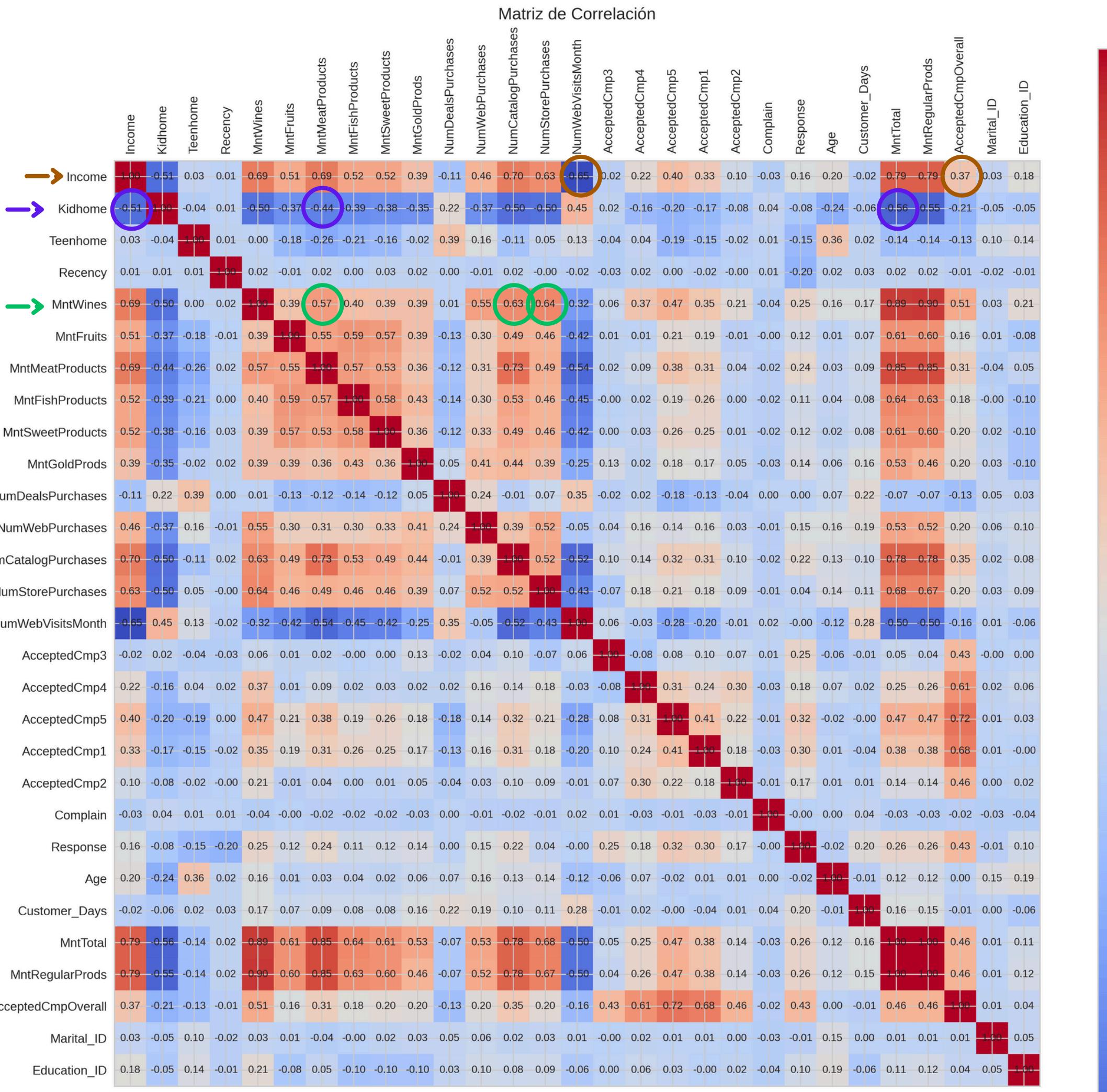
Customers who accepted at least one offer:

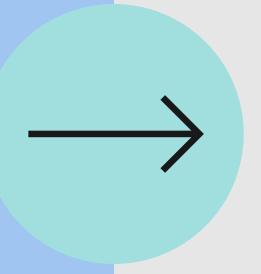


- Have annual incomes x1.5 times higher than those who did not accept any offers.
- Spend more in all categories: Wine (x5.7), Fruits, Meats, Fish, Sweets, and Gold Products.
- Made more transactions across the 3 channels (Web, Catalog, and Store).
- Spent twice as much on Gold Products, but made fewer purchases in Discounted Products.

# Correlation

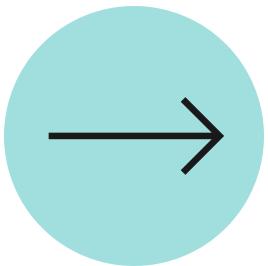
- Spending on wine (MntWines) has a positive relationship with **annual income**, **spending on meat**, and **purchases made through catalog or store**.
- The **number of children at house** (Kidhome) has a negative relationship with **annual income**, **total spending**, and consequently, with **wine spending**.
- **Income** (Income) is also positively related to the **number of campaigns accepted**, but has a negative correlation with **website visits**.



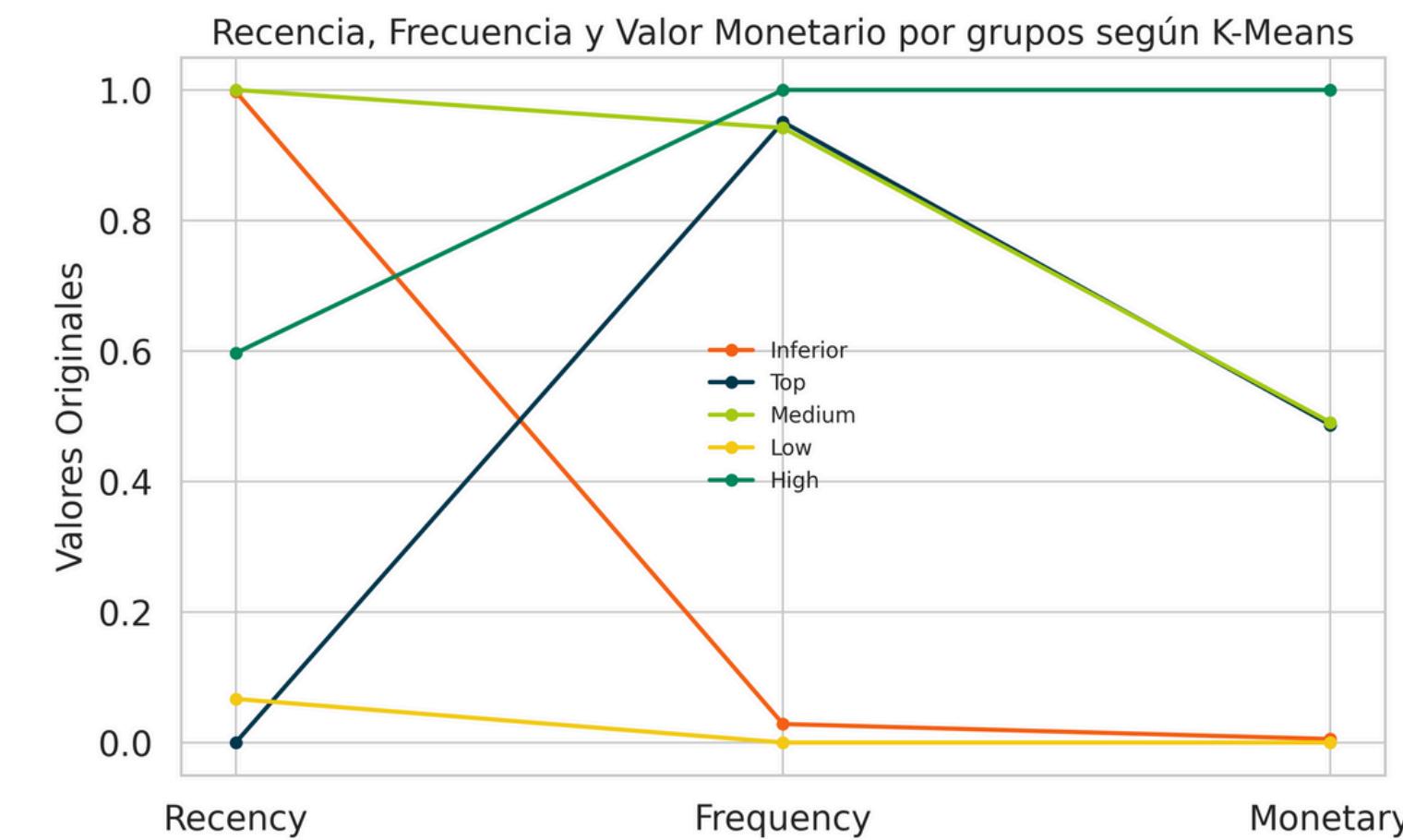
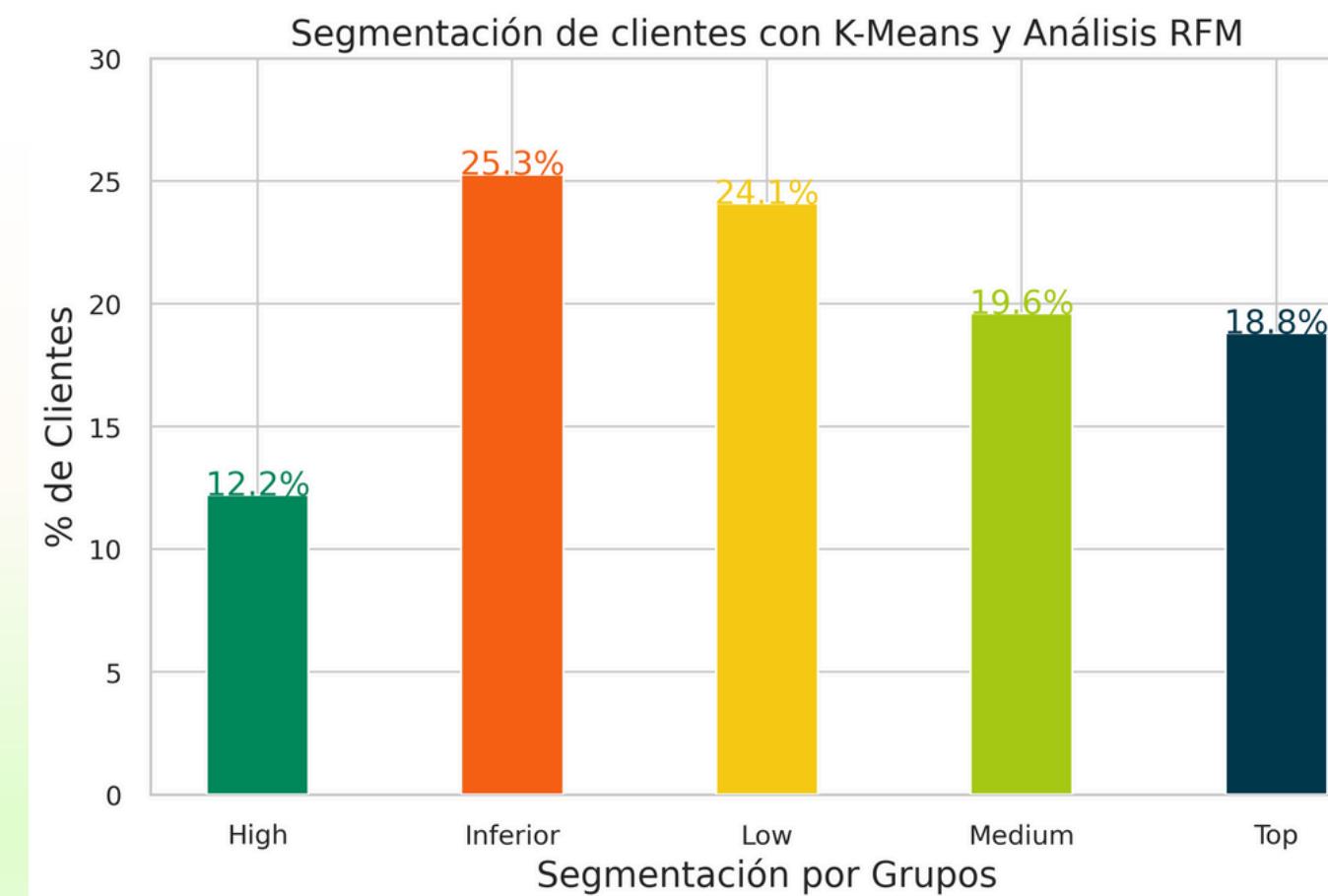


# Segmentation

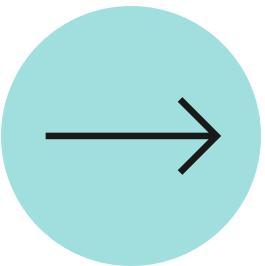
# RFM Analysis and K-Means



Based on Recency, Frequency, and Monetary Value (RFM) of the customers, we classified them into **5 groups**: Top, High, Medium, Low, and Bottom. Customers in the Top group are our most profitable customers, as they buy more (high frequency), spend more (high monetary value), and remain active (low recency value). The Top customers represent 18.8% of our customer base.



# Best Customers



Using this customer segmentation, we could focus the campaign on our most engaged customers, which would be the Top, High, and Medium groups. By using this approach from Campaigns 1 to 5, we can compare the number of customers contacted and the number of gadgets sold, considering the entire customer base and only the best customers:

	Unique Clients	Gadgets Sold
All Customers	2.212	660
Best Customers	1.120	563
Difference (%)	-49,37 %	-14,7 %

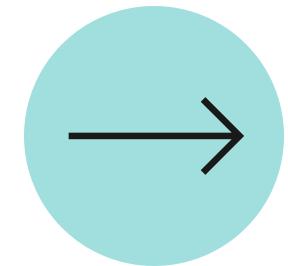
As we can see, by contacting only the most active and loyal customers, we would reduce contact costs by 49.37%, and the revenue from gadgets sold would decrease by only 14.7%.

By focusing only on our best customers, we would increase the campaign ROI from -45% to -7,89%. It's still not the ideal situation, but it represents an improvement.

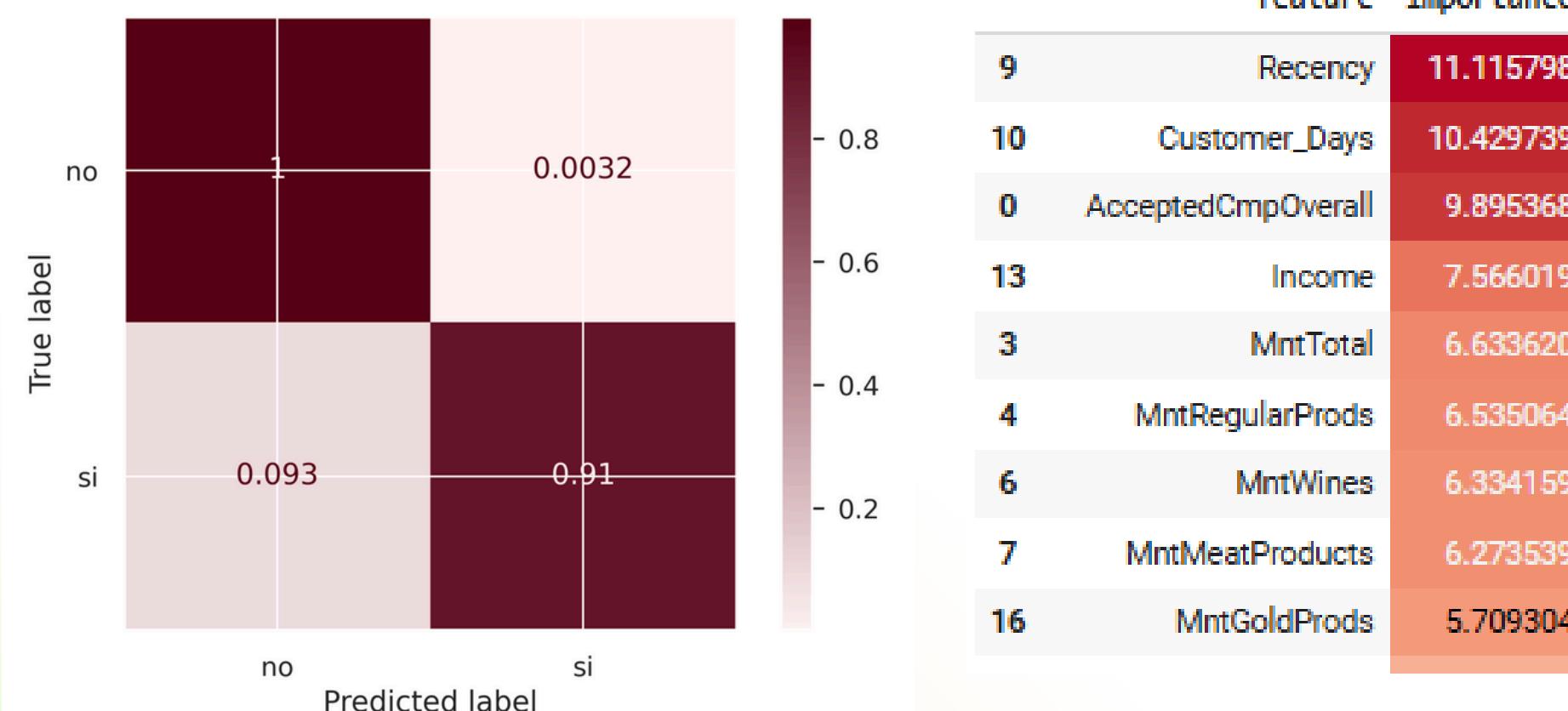


# Predictive Model

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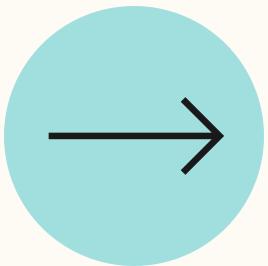
For the new campaign, a predictive model is developed to classify whether the customer will accept the offers or not.



Using a Random Forest model to predict whether a customer will accept the next campaign, we were able to correctly predict 91% of the customers who would accept the offer and 100% of those who would not accept the offer in the last campaign.

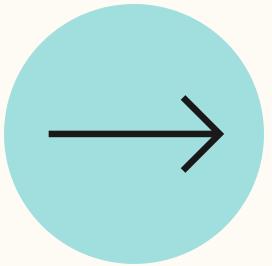
The history of past campaigns, customer income, customer loyalty (tenure and recency), and total spending are crucial factors for this prediction.

# Conclusions



- Using a data-driven approach, it is possible to increase campaign profit by better selecting customers who are more likely to make a purchase.
- Customers who purchased at least one offer in the last 5 campaigns were mainly those without young children or teenagers at home, with higher incomes, more spending and transactions, and more purchases of gold products and fewer purchases of discounted products, making them our best customers.
- By segmenting customers based on Recency, Frequency, and Monetary Value (RFM), it is possible to identify customer groups that should be prioritized for marketing strategies, and others who may require reactivation or retention strategies.
- A predictive model using Random Forest is proposed, which will allow iFood to contact fewer people but with a higher probability of conversion. This means that iFood can save resources in the campaign and focus on customers with the highest chances of purchasing.

# Business Impact



- With an F1 score of 46.25% and an AUC of 0.87, the model has proven to be highly effective in predicting potential buyers, meaning the marketing campaign will be much more efficient.
- The campaign's success rate will increase by focusing on customers most likely to purchase, as the model is correctly identifying 91% of the buyers (True Positives), which will reduce costs and increase profits by contacting only the right customers.
- By contacting only the customers predicted by the model to likely accept the offer (303 customers), we would contact 9% fewer than the customers who actually accepted the offer (333 customers), but the number of gadgets sold would decrease by only 0.91%. Additionally, there was a 90% match rate between predicted and actual responses.
- The model allows contacting fewer people but with a higher probability of conversion. This means iFood can save resources on the campaign by focusing on customers with a higher likelihood of purchasing. By reducing the number of uninterested customers contacted, frustration or discomfort is avoided by not sending irrelevant offers.