Bank Marketing Campaign

Data-Driven Insights to Enhance Customer Engagement and Marketing Campaign Success

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Problem Statement

The banking client seeks actionable insights to **optimize future campaigns** by identifying key characteristics of customers who are likely to **subscribe** and understanding the impact of various campaign strategies.

Specific areas of focus include:

1. **Customer segmentation** based on demographics and financial attributes.

2. **Campaign performance** analysis to identify effective strategies.

3. **Correlation** between customer attributes (e.g., balance, loan status) and subscription outcomes.

4. **Temporal patterns** in campaign success rates.

Customer Demographics

- **Occupation and Education:** The majority of our customers work in blue-collar jobs (9,732), followed by those in management roles (9,458). Regarding education, most customers have completed secondary education.

- **Marital Status and Average Balance:** A significant portion of our customer base is married (27,214), compared to singles. Married customers maintain an average balance of over $1,400, while singles have an average balance of $1,300. Retired customers hold the highest average balance, exceeding $1,900, whereas customers in service jobs have the lowest, at just over $900.

- **Loan Distribution:** Nearly 28,007 customers have either a housing loan or a personal loan. Of these, 4,367 have both types of loans, while 20,763 have only a housing loan, and 2,877 have only a personal loan.

job	job_counts	average_balance
blue-collar	9732	1078.8267
management	9458	1763.6168
technician	7597	1252.6321
admin.	5171	1135.8389
services	4154	997.0881
retired	2264	1984.2151
self-employed	1579	1647.9709
entrepreneur	1487	1521.4701
unemployed	1303	1521.7460
housemaid	1240	1392.3952
student	938	1388.0608
na	288	1772.3576

marital	marital_coun...	average_balance
married	27214	1425.9256
single	12790	1301.4977
divorced	5207	1178.8723

education	education_cou...	average_balance
secondary	23202	1154.8808
tertiary	13301	1758.4164
primary	6851	1250.9499
na	1857	1526.7544

housing_personal_loans
28007

Campaign Performance

- **Campaign Contact Trends and Performance:**
  - **Campaign 1** had the highest contacts (17,544) and subscriptions (2,561) with a subscription rate of ~14.6%.
  - Subscription rates generally declined with smaller campaigns, e.g., **Campaign 32** contacted 9 customers and achieved only 1 subscription (~11.1%).
  - Larger campaigns (Campaigns 1-3) had more total subscriptions but lower efficiency (~11-14% subscription rates), while smaller campaigns (Campaigns 16-32) showed varied subscription rates.
- **Efficiency Insights:**
  - Larger contact volumes lead to more subscriptions but lower conversion rates, suggesting that smaller, focused campaigns may improve subscription efficiency.

Campaign Performance

Call Duration and Subscription Correlation: Customers who subscribed had a significantly higher average call duration of 538 seconds (9 minutes), compared to non-subscribers with an average of 221 seconds (4 minutes).

Recency Drives Success: Clients contacted recently show much higher subscription rates, with 40% at `pdays = 1` and 66.67% at `pdays = 10`, compared to those with longer gaps. Follow-ups within a shorter timeframe maximize effectiveness.

No Prior Contact Lowers Success: Clients with no prior contact (around 36,954 records) have a much lower subscription rate of 9.16%. This emphasizes the importance of maintaining prior engagement to improve the success of campaigns.

Recommendations:

- **Focus on Recent Contacts**: Engage clients who were contacted within the last 10 days, as they show significantly higher subscription rates.
- **Optimize Follow-up Timing**: Shorten the time between contacts to improve subscription success, ensuring that follow-ups are done within a shorter timeframe.
- **Maintain Prior Engagement**: Invest in ongoing communication with clients who have previously interacted with your campaigns, as no prior contact significantly lowers subscription rates.

pdays	customers_contact...	subscription_r...
-1	36954	9.1573
1	15	40.0000
2	37	5.4054
4	2	50.0000
6	10	10.0000
9	12	25.0000
10	6	66.6667
13	6	50.0000
14	9	11.1111
17	4	25.0000
20	2	50.0000
21	4	25.0000
22	3	33.3333
27	4	25.0000
28	9	11.1111

campaign	customers_contact...	subscription_r...
1	17544	14.5976
2	12505	11.2035
3	5521	11.1936
4	3522	9.0006
5	1764	7.8798
6	1291	7.1263
7	735	6.3946
8	540	5.9259
9	327	6.4220
10	266	5.2632
11	201	7.9602
12	155	2.5806
13	133	4.5113
14	93	4.3011
15	84	4.7619

subscribed	call_duration
yes	537.2946
no	221.1828

Subscription Analysis

Age and Subscription Trends: Mid-aged individuals (29–49 years) account for nearly 60% of subscriptions, followed by older customers (50+ years) at 26%, and younger adults (under 29) at 14%.

Occupation Impact: Customers in management roles have the highest subscription rate (~25%), followed by technicians at 15%, while housemaids have the lowest subscription rate at 2%.

Loan Status and Subscription Rates: Customers with either a housing loan or personal loan have higher subscription rates (~8% and ~7%), while those holding both loans show the lowest subscription rate (~6%).

Recommendations:

- **Target Mid-Aged Customers**: Since mid-aged individuals contribute the most to subscriptions, prioritize strategies targeting this group.
- **Focus on Management and Technicians**: Tailor marketing efforts to customers in management roles, as they have the highest subscription rates, followed by technicians.
- **Reevaluate Loan Holders**: Customers with housing or personal loans show higher subscription rates, but those with both loans should be closely analyzed to improve engagement strategies.

job	subscription_rate
management	24.5982
technician	15.8820
blue-collar	13.3863
admin.	11.9304
retired	9.7561
services	6.9767
student	5.0860
unemployed	3.8192
self-employed	3.5356
entrepreneur	2.3256
housemaid	2.0609
na	0.6428

age_group	subscription_rate
Mid-aged	59.5009
Old	26.1864
Adult	14.3127

housing	loan	customers_contact...	yes_subscriptio...	subscription_rate
yes	no	20763	1670	8.04
no	yes	2877	219	7.61
yes	yes	4367	265	6.07

Financial Insights

There are **3,766 customers** with a negative balance, and only **5.58% of them subscribed** to the term deposit.

The correlation coefficient between customer balance and subscription rate is **0.0528**, indicating a very weak positive relationship. While a higher balance slightly correlates with increased subscription rates, the relationship is nearly negligible.

Key Takeaways:

- **Near Zero Correlation**: A value close to 0 suggests almost no linear relationship between customer balance and subscription rates.
- **Limited Predictive Power**: Customer balance alone is not a strong indicator of whether someone will subscribe.

This highlights the need to consider additional factors when analyzing subscription trends.
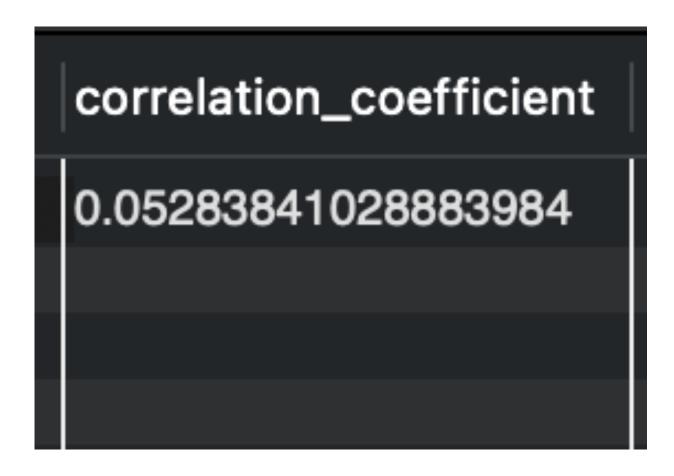
Temporal Insights

March has the highest subscription rate, surpassing **50%**, followed by December and September. May has the lowest, with just over 6%.

Subscription rates are notably higher on the **1st day of each month** (27%), followed by the 10th and 30th. This suggests that customer engagement on specific days could significantly boost subscription rates.

Recommendations:

- **Target High-Impact Months**: Focus marketing efforts on March, December, and September, when subscription rates are higher.
- **Leverage Key Days**: Increase outreach on the 1st, 10th, and 30th of each month to capitalize on the observed spike in subscription activity.
- **Optimize Customer Contact Strategy**: Tailor communication schedules based on these patterns to maximize conversions and improve overall engagement.

month	subscription_rate
mar	51.99
dec	46.73
sep	46.46
oct	43.77
apr	19.68
feb	16.65
aug	11.01
jun	10.22
nov	10.15
jan	10.12
jul	9.09
may	6.72

day	subscription_rate
1	27.95
10	23.09
30	17.31
22	17.02
3	16.50
4	15.92
25	15.83
12	15.22
13	15.21
2	14.08
15	13.98
24	13.87
16	13.57
23	13.42
27	13.38
11	12.24

correlation_coefficient
0.05283841028883984

total_negative_balance	percent_subscribed
3766	5.58

Actionable Insights

Calls lasting **over 300 seconds** have the highest subscription rate at **28.17%**, followed by 121-300 seconds at 8.57%. The lowest subscription rates are seen in the 31-60 seconds and 0-30 seconds ranges. This indicates that longer call durations are more likely to result in subscriptions.

Customers **without default** status have a higher subscription rate of **11.80%**, while those with default status have a lower rate of 6.38%. The dataset primarily consists of customers without defaults, with only about 2% of customers having a default status.

Recommendations:

- **Focus on Longer Calls**: Prioritize longer calls (300+ seconds) as they show a stronger correlation with subscription success.
- **Target Non-Default Customers**: Since non-default customers have a higher subscription rate, strategies should focus on this group.
- **Reevaluate Default Customers**: With only 2% of customers having a default status, further investigation into this group's behavior may provide opportunities for improvement.

duration_range	total_calls	successful_ca...	subscription_rate
0-30 seconds	2010	5	0.25
121-300 seconds	18893	1620	8.57
300+ seconds	12274	3458	28.17
31-60 seconds	2756	4	0.15
61-120 seconds	9278	202	2.18

default	total_custom...	successful_subscripti...	subscription_rate
no	44396	5237	11.80
yes	815	52	6.38