

Optimizing Customer Strategy — MKTG 580L

Group 2 Final Report

Sraddha Patel, Sarin Grey, Tarkit Dua, Tashiana
Williams

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Summary

The following report discusses on our marketing strategy to approach new as well as existing customers for our two services: 1) Credit Card, and 2) Savings of our Bank. The report consists of several steps as follows

- 1) BACKGROUND: discusses the parameters used for our model to analyze our strategy. Here, our analysis also depends on the subscription of mails or emails for the saving and credit card services of our Bank,
- 2) ACTION PLAN: discusses the details of our results obtained through our model for both the services for three different types of customers,
- 3) RECOMMENDATIONS: discusses overall analysis and steps to be taken to achieve improvements in the overall performance of the bank i.e. reduces cost to 87.69% in *savings* and increases profit by 8105.90% in *credit card*,
- 4) OTHERS: discusses about various aspects like how customer lifetime improvement (CLV) improves over time using our recommended strategy, how it differs from our initial recommendations given during our initial analysis, and what are the risks and limitations of our model, and
- 5) CONCLUSION: this last step gives the final interpretation of our strategy i.e. to focus on increasing action in the credit card service and reducing in savings as we would not profit from expanding our efforts in savings. We can further prioritize increase email and mail services in credit card services.

Background

To get a better understanding of consumption, we wanted to take a look at the factors that are both static and dynamic. Thus, we chose the **parameters** as follows: **previous savings balance, previous credit card balance, tenure, gender, income, age, and household size**. We chose these parameters because all have an effect on the consumption function. Previous savings balance helps us understand the amount of savings the customer had in the previous period. If they had a large balance, does that imply they have been with the bank for many years? Could this also affect tenure? A small balance could also mean a lower household income. Because the previous savings balance has so many possible reasonings, we felt it would be crucial to include. In a similar vein, we included lag credit card balance due to the many possible reasonings. If the credit card balance is low, does this mean the person is responsible and pays off their debts? This could make them a strong candidate for cross selling. If the credit card balance is high, this could be indicative of a large income or a large household size that requires a lot of spending. In addition to these variables, we included gender and age because these are characteristics that affect behavior. Gender stays the same but reveals some insight, and with age people tend to alter their decision making.

For retention, we wanted to take a deep look at which factors influence whether or not a customer is retained, in other words whether or not they accept our marketing action. For this function, we chose previous savings balance, previous credit card balance, action, tenure, gender, age, income, nprod and comp. Previous savings balance was included here because the savings balance from last period gives some insight into future periods. If somebody has a high savings balance, they probably have no intentions of leaving the bank and would likely be receptive to cross selling. Previous credit card balance was included

because if the customer has a high balance, then they must be staying with the bank but are probably less likely to respond to cross selling efforts due to a lack of funds. Action must be included in this function to see if there is any correlation between action and acceptance, or retention. Tenure is included because we believe that the higher the tenure, the more the customer is likely to trust the bank. Gender, age, and income were included because these are all factors that affect behavior and changes, with the exception of gender. The last factors included are nprod and comp, which are quite important. Nprod is the number of cross selling products that the customer is currently subscribed to. This is an interesting factor because a high nprod could mean a higher probability of being receptive to action, but it could also mean that a customer already has enough services and would not be open to another. Comp is the fraction of the customer's assets not associated with the bank, and we deemed this important because we believe that a high fraction of this would lead to a lower acceptance rate.

Lastly, we examined email and mail actions specifically given their differences in nature. Sending out emails will help us target the most valuable customers based on responses. If a customer is subscribed to email, we can measure the length of their subscription as a basis for measuring retention. If a customer doesn't unsubscribe then we can assume that they have a high Customer Lifetime Value. On the other hand, regular mail cannot be ignored as easily as email and there is a lesser risk of other companies competing for our customer's attention. Mail can be tailored to particular customers based on how valuable they are to us.

Action Plan

To contextualize our action plan, we have **selected three customers** to draw comparisons between. We have chosen customer #1, a 74 year old male, customer #35, a 38 year old female, and customer #51, a 52 year old male. These three customers have varying household sizes and income. All of these factors put together lead to varying CLVs. The table below shows the demographic information, as well as the CLV forecasts for both savings and credit card.

Cust ID	Age	Gender	HH Size	Income	Savings CLV (obs profit)	Savings Exp Profit T=0	Savings Exp Profit T=1	CC CLV (obs profit)	CC Exp Profit T=0	CC Exp Profit T=1
1	74	Male	3	4	205.45	-12.65	-2.95	1.42	2.18	1.76
35	38	Female	1	5	258.35	-10.32	-13.72	0	1.95	1.67
51	52	Male	7	2	-167.51	-9.90	-14.46	0	2.22	7.65

In the next series of tables, we will be depicting the action plans for each customer's savings and credit card accounts. We have accounted for 12 periods, half of the total amount of time in the data. A zero (0) represents no action and a one (1) represents take action. Further, an "M" represents action in the form of mail and an "E" represents action in the form of email. An **(S)** next to the customer ID represents the table for **savings**, and a **(CC)** next to the customer ID represents the table for **credit card**.

Cust #1 (S)	0	1	2	3	4	5	6	7	8	9	10	11	12
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Previous action plan	M: 0 E: 0	M:1 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:1 E:1	M:1 E:1

Cust #1 (CC)	0	1	2	3	4	5	6	7	8	9	10	11	12
Previous action plan	M: 0 E: 0	M: 1 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0	M: 0 E: 0
Action plan at time 0	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:0 E:1	M:0 E:1	M:0 E:1
Action plan at time 1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0

From the above tables, for customer #1, we can conclude that for savings people of higher age group (74 in our table), those belonging to income bracket 4 and having a household size of 3, both sending mails or emails work for most of the tenures (0-6, 11-12) but there is no preference of both the marketing actions for tenures 7-10. As far as credit cards are concerned for the same group of people, mail would not be preferred for the customers whereas email action is preferred during tenures 0-7 and remains unchanged for the rest of the tenures.

Cust #35 (S)	0	1	2	3	4	5	6	7	8	9	10	11	12
Previous action plan	M: 0 E: 0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 1	M:0 E:0	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1

Cust #35 (CC)	0	1	2	3	4	5	6	7	8	9	10	11	12
Previous action plan	M: 0 E: 0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 0	M:0 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1
Action plan at time 1	M:0	M:0	M:0	M:1	M:1	M:1	M:1	M:1	M:1	M:1	M:1	M:1	M:1

time 1	E:1	E:0	E:0	E:1	E:1	E:1	E:1	E:1	E:1	E:1	E:1	E:1	E:1
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For customer #35, aged 38 with a household size of 1 and an income bracket of 5, we can see for savings that both sending emails and mails works for all the periods, 1-12, except for tenure 0 where no marketing action has any effect or needs to be taken. For credit cards, both the marketing actions of sending mails and emails are taken for tenures 3-12 while there is no effect of marketing action- mail for the tenures 0-2.

The two charts below depict the actions for our last example customer. For customer #51, aged 52 with a household size of 7 and income bracket of 2, we can conclude from the above tables that for savings both marketing actions mail and email actions should not be taken. For all periods, except period 8, the marketing actions do not make a difference for the customer's lifetime value. As far as credit cards are concerned, there is no need to send mails for periods 2-12 whereas it should be sent for periods 0-1. On the other hand, emails are more effective for periods (0-4, 6) and shouldn't be sent for the rest of the periods.

Cust #51 (S)	0	1	2	3	4	5	6	7	8	9	10	11	12
Previous action plan	M: 0 E: 0	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:1 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0

Cust #51 (CC)	0	1	2	3	4	5	6	7	8	9	10	11	12
Previous action plan	M: 0 E: 0	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0
Action plan at time 0	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:1 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:0
Action plan at time 1	M:1 E:1	M:1 E:1	M:0 E:1	M:0 E:1	M:0 E:1	M:0 E:0	M:0 E:1	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0	M:0 E:0

Recommendations

Goal: To increase bank's performance and help them increase their profit by retaining more customers and leading them to contribute more of their financial assets to this bank.

When no information is available or determined on consumers' initial consumption or balance with our bank:

Since the customers are not profitable in savings service and the current strategy is costing us more than giving in return, it is better to not take any action through mail or email. However, when looking at the credit card service, one can see that for sending mail and email marketing messages varies during the time period and across different bank customers. This leads to an improvement in the bank's overall performance by reducing cost to 87.69% in *savings* and increasing profit to 8105.90% in *credit card*.

Along with our increase in bank performance for savings and credit card, our action rate for savings drops down from (action in mail) 4.85% to 0% and (action in email) 3.85% to 0%. For checking, it increases from (action in mail) 4.85% to 14% and (action in email) 3.85% to 42%. This indicates that we should increase our effort in credit card and reduce in savings for sending mails and emails.

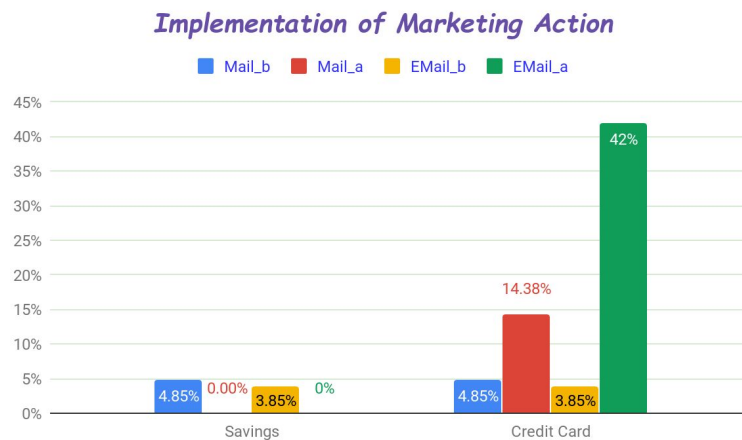


Chart above explained as: *Mail_b* and *Email_b*: amount of action *before* the implementation of our strategy for mail and email respectively. *Mail_a* and *Email_a*: amount of action taken *after* the implementation of strategy for mail and email respectively.

When initial information on consumers' consumption pattern is available or determined with respect to our bank:

Since the customer's initial consumption behaviour in savings and credit card service is available, our strategy indicates an increase in marketing action for mail and email varying on the nature of the consumer across the time. This positively impacts the bank's overall performance by reducing cost to 91.20% in savings and by increasing profit to 14,985.40% in credit card. Along with our increase in bank performance for savings and credit card, our action rate for savings increases from (action in mail) 4.85% to 12.92% and (action in email) 3.85% to 14.15%. For checking it increases from (action in mail) 4.85% to 11.54% and (action in email) 3.85% to 21.92%. **This indicates that we should increase our effort in credit card and as well as in savings for sending mails and emails.**

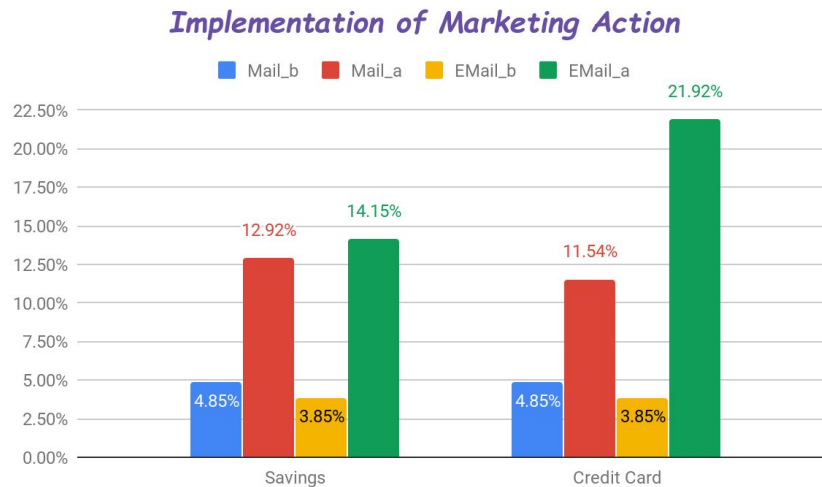


Chart above explained as: *Mail_b* and *Email_b*: amount of action *before* the implementation of our strategy for mail and email respectively. *Mail_a* and *Mail_a*: amount of action taken *after* the implementation of strategy for mail and email respectively.

For consumer attributes like age, income, household size and gender, they affect our strategy and increases the effectiveness of our marketing action as seen above when discussed about the action plan for a few of the bank's customers. Thus, we believe that it is necessary to include consumer attributes while considering our action plan/strategy to cover all the possible contingencies.

MARKETING STRATEGY:

SAVINGS: Possible marketing actions that could be concluded from our data could include cashback deals, lucky draws and rewards to those with a high credit card usage or savings balance depending on our action plan. With action in savings one can issue a periodic bonus interest. It means once in a while you give them an additional interest depending on their savings balance.

CREDIT CARD: The company can reward them with shopping or travelling credits associated with partnered airlines. This helps increasing both of marketing strategy. We can also influence their payment dates with credit line increases. Reminders of payment date can also include a reminder of reward points and chance of winning a cashback bonus.

Our CLV (Customer Lifetime Value) Improvement

Our recommendations are superior to the current business strategy, which is evident in the increased CLV post optimization. In terms of **savings**, our CLV increased from -4,813.75 to -423.73 at time one. This was a **91.20%** increase. While the numbers are negative, the optimization still improves the CLV, making it a less negative number closer to zero.

In terms of **credit card**, our CLV increased from 1.24 to 187.78 at time one. This was a **14,985.40%** increase. This magnitude had a great effect on our CLV. Given these increases in percentages, it is evident that our model and our recommendations will optimize and lead to an increased customer lifetime value.

Comparison to Initial Recommendations in GA 1

Recommendation from GA#1

In our initial recommendation, we believed that tenure was the most important variable and was most representative of CLV because we noticed a lower acceptance rate amongst customers of longer tenure. From this we inferred that customers who have been with the bank for longer did not want to be bothered by communications. As a result, we suggested sending out the communications when the customers are fairly new and thus have a higher acceptance rate. We believed that in regard to savings, offering a more lucrative savings interest rate would increase the likelihood of acceptance. On the other hand, we recommended offering interest free usage and cashback bonuses for the initial few months of credit card usage to attract the attention of customers, both old and new.

After analyzing and working through the group assignments, we found that other factors take precedence over tenure. Our data led us to determine that customers don't have to necessarily be new to have a high acceptance rate. Furthermore, we noticed that without prior information about the customer, taking action in savings is not helpful, but with credit cards, we can still successfully implement action if this past history is unknown. For example when customer 1 had a tenure of 0 in savings, we found that without prior information about the customer, it would be better for us to not take any action. However, when we are able to obtain information on this customer's past consumption, we should take both email and mailing action. As far as credit with this same customer in tenure 0, we would take both actions when we had no prior information about the customer and when we have this prior information we would take email action only. We see that having prior information about the customer is more important than tenure when it comes to determining which action to take in either service. Contrary to our initial recommendation, we realize that it would not benefit us to send out communications strictly based on this variable. **Previously, our suggestion to send out communications to new customers did not take into account the fact that these services are separate and will elicit differing consumption patterns regardless of tenure.**

Risks and Limitations

Over time, certain parameters of our model could change and this possibility is not included as a contingency, leading to limitations in our model. These **changeable variables** include income, household

size and even age. A change in income might change buying habits thus impacting credit usage and savings activity. An increase in household size may lead to higher customer engagement, whereas a decrease will cause the opposite. Age may also be a limitation because older customers may not be as responsive to marketing action. They are **not likely to be as tech savvy** as younger customers, so email action will not be beneficial to use on these customers and older people tend to be more set in their ways so sending out mail may prove to be a waste of our time. This **heterogeneity** across customers shows that many of our variables are **volatile** and our model will need to continuously be **manipulated** to fit these changing variables.

Conclusion

In summation, we recommend that when no prior information is available about a customer's past consumption, we would focus on **increasing action in the credit card service** and reducing in savings because we do not profit from expanding our efforts in savings. When we do have past information, we can then **increase both mailing and email action in both services** because overall cost is reduced and profit is increased. Our strategy would prove to be more beneficial for the bank because it is cost effective and it ensures that resources are not wasted taking action that does not maximize profit. Even considering the risks, our model improves the bank's total profit/CLV and should therefore be implemented.

Savings		
	at time = 0	at time = 1
Total obs	Total expected by optimization	
-4813.746106	-592.3580996	-423.7253695
Improvement by optimization	-87.69%	-91.20%
Credit Card		
	at time = 0	at time = 1
Total obs	Total expected by optimization	
1.2444344	102.1171002	187.7279673
Improvement by optimization	8105.90%	14985.40%