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Increasing Your Marketing ROI with SAS® Marketing Optimization
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ABSTRACT

This paper provides information for marketing organizations that are in the evaluation stage of making an investment in marketing optimization.

Many marketing analysis departments have known for years that one of the best ways to improve a company's direct marketing performance is to apply optimization techniques to related marketing activities. This was once the domain of only the most sophisticated marketing organizations, but advances in software products have made optimization practical for a much broader group of marketers. As with all new investments today, obtaining executive management approval for the funding of these projects requires solid business justification. This paper provides some of the tools you need to sell your ideas to management:

- a summary of the marketing optimization problem
- an overview of how operations research and other heuristics can dramatically increase financial success in the marketing arena
- a discussion on how business constraints (for example, budget restrictions and contact policies), and customer complexities (for example, household membership) can be addressed with technology
- a case study of how optimization could be put into practice

INTRODUCTION

Many companies struggle to get the right message to the right client through the right channel. They use everything from intuition to advanced statistical models to pick the right client for the product they are trying to sell. Few companies, however, deal effectively with the communication overload some clients receive or the lack of communication for other clients. Multiple, ever-changing offers and large customer populations complicate the problem. In addition, the complexity of client contact rules and other business constraints make it nearly impossible to define the best and most profitable solution.

Some companies choose to ignore these issues, although not necessarily deliberately. These companies often operate in organizational silos (product, segment, and region). They need additional information systems or marketing to move the organization to an integrated approach. Those that *are* dealing with these issues typically fall into two groups: those that handle the overlap by prioritizing campaigns (a product-centric approach), and those that prioritize by clients (a client-centric approach). Neither of these approaches adequately addresses higher-level business objectives, such as a goal of penetrating the market by selling at least 2,000 new XYZ products next quarter, or business constraints such as budgets and corporate contact policies.

Sometimes methods that marketers refer to as *optimization* can refer to a broad range of approaches. This inconsistency in general can confuse others in your organization.

What we mean by *optimization* is a mathematical method that examines all possible solutions and selects the one that achieves the best possible outcome while satisfying all of the constraints. Selling this *science* to Executive Management might require some *art* on your part, and we hope to cover both in this paper.

OPTIMIZATION OVERVIEW

In general, optimization techniques use linear integer programming to solve for the problem of maximizing or minimizing a linear objective function subject to linear constraints. In Marketing, we often use this example: "Given a customer C and an offer O, should I make the offer O to customer C?" This creates binary variables, with a *yes* and *no* decision, which is modeled mathematically as a value of 0 or 1. As a result, there are as many binary variables as there are eligible customer-offer combinations.

The problem above is easy to solve if you have five customers and two offers, but the problem grows exponentially with the addition of every customer, offer, or business constraint. The computations become very difficult when you have problems with hundreds of thousands of variables and around the same number of constraints. These problems surpass the limits of the capabilities of current general-purpose solvers, both in terms of memory and time to solve.

Marketing problems generally exceed the scope of the best currently available solvers for integer programming. Problems that have tens of millions of variables and numbers of constraints of the same order are quite common, and even larger problems with more than 100 million variables often arise. As an example, imagine a relatively simple and small marketing optimization problem with one million customers. For each customer, you must decide whether to offer at most one out of 20 offers. On average, suppose each customer is eligible for half of the 20 offers. You might also have a few simple business constraints, such as budgets, offer counts, or risk. Even this simple example results in an integer programming problem with approximately 10 million variables and more than one million mathematical constraints.

The nature and size of the problem worsens significantly as you add more complicated contact policy constraints. Two of the most common types of contact policies are rolling constraints that are based on time (for example, allowing no more than two call-center offers every three weeks) and blocking contact policies (for example, any offer through the call center blocks all direct mail offers for at least two weeks). Even a single rule of this type can translate into several constraints per customer, adding millions of constraints to the optimization problem. Therefore, marketing optimization problems for even moderately sized organizations can easily result in an integer optimization problem with 100 million variables and 50 million constraints. Thus marketing analysts need specialized algorithms to tackle both computer memory and computational time issues. These algorithms are built in to specialized software programs such as SAS® Marketing Optimization.

SAS MARKETING OPTIMIZATION

SAS Marketing Optimization uses propensity and expected responder value scores and incorporates the constraints that the marketer defines to produce the optimal list of offers at either the client or household level. The more granular your scores are, the better SAS Marketing Optimization will be able to detect differences at the lowest level

of offer or treatment. For instance, if every customer has propensity scores for mail, email, and telephone solicitations for each product, you should expect better results than if you have only segment-level propensities with no channel-specific detail. SAS Marketing Optimization can often find a reasonable solution, with a substantial Return On Investment, even if you have an average score that represents the combination of all three channels. SAS Marketing Optimization also enables you to do scenario analysis so that you can easily see the results of the options you choose for your constraints.

CONSTRAINTS

Constraints are fundamental to a marketing optimization problem. Global rules can be used to make sure that you stay within a specified budget for certain segments of customers, or that certain products get a minimum number of contacts. The rules can also be used to ensure that your final list meets a minimum average credit risk score, or that certain segments of clients get only a maximum number of contacts over a period of time. More advanced constraints can be used to block a client from getting one offer if they receive another one (for example, a mortgage offer could block a credit card offer). Without constraints, the process is more of prioritization than optimization. You should consider carefully the constraints that you use, however, because the constraints restrict the set of feasible solutions that the optimization algorithm uses to find the optimal solution.

"SELLING" THE INVESTMENT

Your marketing department's maturity level plays a large role in how SAS Marketing Optimization affects your return on investment. As a marketing organization becomes more mature, it moves through several typical stages of analytical development. At first marketers make decisions based on intuition and gut feel. Then through the integration of data technologies, they begin reacting on analytics. The next step is to use models to predict performance and create marketing lists. Finally, marketers reach a stage where they need new technologies to make their campaigns more efficient and maximize their marketing efforts.

Depending on where your organization is on the Client Intelligence Maturity Model, implementing SAS Marketing Optimization will either be an evolution or a revolution. The key points are 1) you need to have at least some modeling in place, and 2) you will achieve the most impact if you have an executive-sponsored marketing philosophy to centrally control outbound client contact. Having this philosophy in place drastically reduces the effort required in proving the investment. Like most technologies, this will not fix internal politics or flawed business processes, but it will allow you to focus on showing the revenue enhancements and cost savings that optimization brings rather than leading a philosophical debate about client-centric marketing.

The further to the left you are on the chart, the more ROI lift you will achieve per campaign, but the further to the right you are, the bigger the overall impact will be. For instance, if you are on the left, you are likely running very few campaigns that could have only one or two offers. The percent increase in ROI per campaign offer could be huge. However, if you are running 10 campaigns per month with 100 offers with several constraints at different segment levels, your ROI lift might be lower, but the aggregate is huge, and it pays for your investment within only a few campaigns.

The more you're spending on marketing, the smaller the investment is as a portion of the total. But remember, the less sophisticated your marketing efforts are before implementing SAS Marketing Optimization, the bigger the impact will be.

MARKETING EFFICENCY GAINS

The easiest justification for optimizing campaigns is cost reduction or efficiency gains. The further to the left your organization is on the Maturity Model, the more likely that your organization is contacting clients too frequently or making offers that don't maximize response or profit. SAS Marketing Optimization can sometimes pay for itself by de-duplicating client contacts in an intelligent manner. For instance, in a prioritization approach, you would sort your offers and fill your list until you run out of budget, but with optimization you would take the budget constraint into account, along will all of your other constraints. Finding the optimal solution involves making tradeoffs to obtain the best possible outcome in terms of the overall objective, such as maximizing response or profit. The optimization process therefore provides solutions that other approaches, such as prioritization, cannot find.

Another efficiency gain is the ability to repeat your campaigns more efficently. For example, by standardizing the process and making your optimization repeatable for monthly campaigns, analysts have more time to build models and do analyses. This savings will give you the ability to spend more time creating more complex offers and testing more constraints.

If your organization is already near the upper right quadrant of the Maturity Model and you have a home-grown optimization solution, you might want to put your operations research specialists to work on solutions to other important problems. With SAS Marketing Optimization in place, they are no longer spending a large portion of their time reporting to campaign managers who are doing similar activities. Additionally, with SAS Marketing Optimization, one marketing analyst can create repeatable processes, which can be transferred to other marketing analysts.
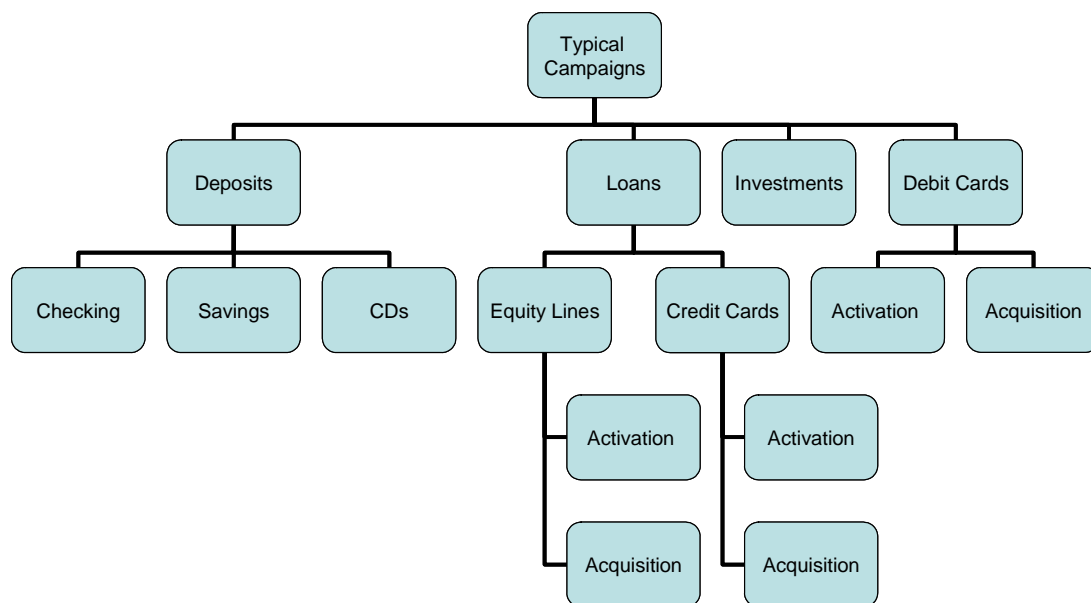
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INCREASING REVENUE

If your organization is at least at the analytical or product-centric stage, then you probably have models in place. Optimization can maximize your objective by using your propensity scores to find the best overall solution. As you begin creating your campaigns with optimization in mind, you can create models for not only the product a client needs but also for the channel they would use. These inputs make optimization even more powerful and add significantly to the revenue enhancements. The next level of revenue enhancement is the expansion of your marketing efforts: adding campaigns, testing more complex scenarios, and fine tuning your constraints.

SAMPLE CASE STUDY

There are many optimization successes where the ROI improvement is anywhere from 4% to over 100% for any given campaign. Of course the driver for ROI is your current spending. A 100% ROI increase in a marketing organization that spends only $200,000 a year on direct marketing might not be enough to make the argument for purchasing an optimization tool, unless it's the first step towards becoming a more sophisticated marketing organization.

The following case study is a more detailed look at the ROI impact of a hypothetical implementation. All of the response rates and efficiency gains are estimates. To get actual numbers you would need to implement SAS Marketing Optimization on your own data. This example will give you a way to estimate the response and efficiency gains that you would need, given your current budgets, response rates, and costs.

A large regional bank is making 500,000 outbound contacts per campaign, and it has four major campaigns per year. Each campaign can have as many as 10 product offers, and the bank is using model propensity scores to rank the clients by product. The bank is prioritizing within two groups of offers, deposits and loans, by product at a household level. Through analysis the bank determined that 30% of the clients still get more than one offer after the prioritization. It uses three channels, direct mail and telemarketing through either the branches or the phone center and sends most of its mailed offers to the two telemarketing channels for follow-up calls. The average cost per attempted contact is around $2.50, and the average response rate is about 1.2%. For each responder the bank estimates that the average one-year profit is $250, although this varies by product.

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There are three approaches the bank could take to implementing optimization. Each approach has different cost savings and revenue components.

In the first approach, the analysts at the bank need to incorporate global contact policy constraints that would apply to the entire campaign, such as each client getting only one offer. However, since they don't have evidence showing how many offers or combinations of offers work best, they should build in tests so that they can make adjustments later. They should also incorporate their budgets for each offer and the risk constraints that they have for the loan offers into the optimization problem. Lastly, they would have to set their objective function to maximize response because they do not have value scores for their offers.

With this information, SAS Marketing Optimization selects clients that the bank's old prioritization method would not have picked up, which gives the analysts a much better result. The solutions that SAS Marketing Optimization presents will often be surprising because it doesn't always choose the client or channel with the highest score. Using a simple spreadsheet, we can input the bank's estimated response rates and efficiency gains. Hypothetically, this yields a 12% increase in campaign net profit with ROI going from 20% to 32%, gaining $120,000 over their net profit before optimizing.

The second approach would be to increase the bank's marketing sophistication. Here the analysts would build models that differentiate response by each channel that they use. They could also incorporate more segmentation and test new constraints. Some of the new constraints could be to incorporate call center capacity limits. These could be different depending on the amount of resources that different offers would require. The analysts can also set a minimum number of expected offers for particular products if, for instance, there are predefined targets that have to be met. In this example, the bank would get a lift in average response rate and is still getting efficiency gains. The hypothetical lift in net profit for the second approach is $1,130,000, and their ROI per campaign is 50%.

The final approach allows them to use the savings they get from efficiency and expand their marketing programs. They would still do everything that they would have done in the second approach, but they would use those techniques against more campaigns and more sophisticated offers. Some additions to the optimization problem could be more complex constraints, such as setting a minimum ROI profit for particular offers. For their credit offers they could add in constraints that say their average credit line increase must be less than a certain amount. In this example they would increase their campaigns per year from four to six. The resulting ROI is 73%, and the lift in profit from the previous year is $1,091,250.

For the regional bank, the second approach would most likely be the best place for it to start because the bank's analysts already have models in place and would only need to incorporate channel specific scores. They could use the first year to experiment with different offers and move to the third approach in year two. With SAS Marketing Optimization, they can also perform scenario analyses to examine the effect of their constraints. This will give them the ability to validate long-standing rules that they built based primarily on intuition.

A larger organization that is doing more campaigns might not get as big an ROI lift, but because they are doing so many communications, a lift as small as 2% could pay for the marketing optimization investment in only a few campaigns.

Using the spreadsheet below you can replace the basic assumptions with your own numbers to determine if your company is ready for SAS Marketing Optimization.

	Previous Year Average Campaign	First Year with SAS Marketing Optimization		
		Scenario 1 Value from reducing volume & exploiting efficiencies	Scenario 2 Value from adding analytics to market smarter	Scenario 3 Value from using insights to execute more and more complicated campaigns
Number of campaigns	4	4	4	6
Reduction in number of contacts per campaign		30%	10%	25%
Number of contacts / campaign	500,000	350,000	450,000	337,500
Total contacts	2,000,000	1,400,000	1,800,000	2,025,000
Cost per piece	$ 2.50	$ 2.50	$ 2.50	$ 2.25
Cost subtotal	$ 5,000,000	$ 3,500,000	$ 4,500,000	$ 4,556,250
Cost reduction (reduction in marketing budget)		$ 1,500,000	$ 500,000	$ 443,750
Average conversion / take rate	1.200%	1.320%	1.500%	1.560%
Increase in take rate (over baseline)		10.0%	25.0%	30.0%
Number of takes	24,000	18,480	27,000	31,590
Average profit per take	$250	$250	$250	$250
Total Revenue	$ 6,000,000	$ 4,620,000	$ 6,750,000	$ 7,897,500
Less Costs (not including solution costs)	$ 5,000,000	$ 3,500,000	$ 4,500,000	$ 4,556,250
Net Profit	$ 1,000,000	$ 1,120,000	$ 2,250,000	$ 3,341,250
ROI	20.0%	32.0%	50.0%	73.3%
Increase in Net Profit over Original Campaigns		$ 120,000	$ 1,250,000	$ 2,341,250
Percent increase in Net Profit over Original Campaigns		12%	125%	234%

CONCLUSION

Using the inputs of marketing budgets, number of contacts per campaign, number of campaigns per year, and the estimated lift in both efficiency and response you can begin to create your value proposition.

Armed with these figures and a good story, you have the information you need to bring your request to senior management. Make sure to focus on the revenue and cost savings, both hard and soft, that marketing optimization offers. Remember to go in with more than just one argument; it's too easy for management to come up with an excuse to continue doing things the way they always have done them. Optimization can be an evolution or a revolution for your company, but either way it will increase marketing profits.

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RECOMMENDED READING
Marketing Automation
Practical Steps to More Effective Direct Marketing
Jeff LeSueur

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