Maximize you marketing efforts with Experimental design techniques

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DataMaApp – Who are we ?

DataMaApp (*Data*base *Ma*rketing *App*lications) founded in 1999

DataMaApp strives;

for Data driven results
to Maximize your profits
while Appealing to your customers

DataMaApp – Who are we ?

- DataMaApp has over 40 years combined experience applying statistical data tools on customers' data to drive positive business growth and acquisition results.
- Experience ranges over a wide variety of clients including the banking, telco, automotive, research and printing industries
- Experience in both the business to business and business to consumer space
- Services range from standard profiling and reporting to more advanced customer/prospect value systems, predictive statistical models, payback/LTV metrics and advanced multi-variate test designs

DataMaApp – our service

DataMaApp provides strategic support using data in four key business areas :

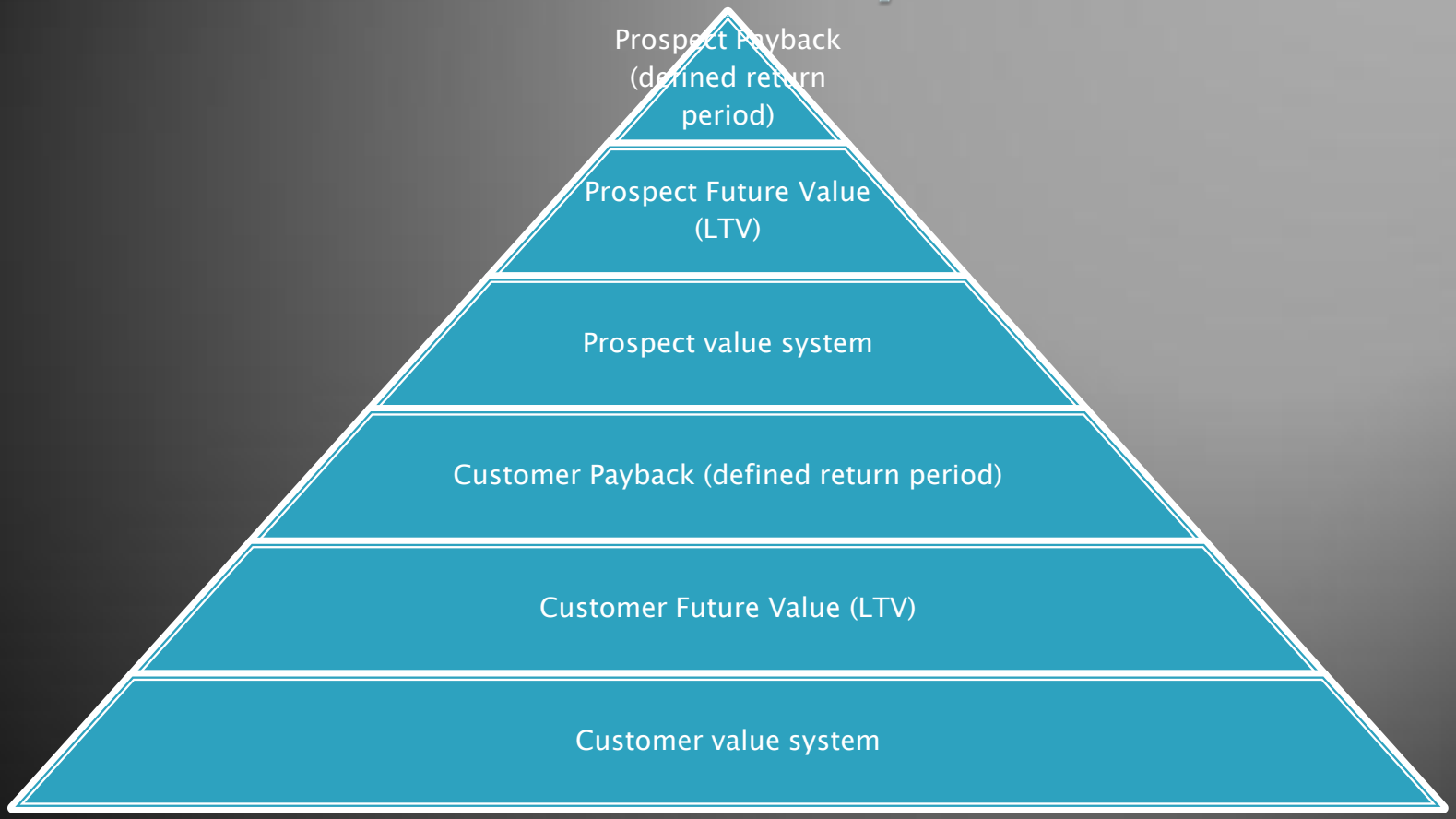
1. **How much should you invest ?**
2. **How should you invest ?**
3. **Test Design**
4. **Campaign / Market performance analysis**

DataMaApp – *Data*base *Ma*rketing *App*lications

1. How much should you invest ?

- **Customer and prospect value**
  - RFM , Knowledge based value systems, TBS (transactional based segmentation)
- **Life time value**
  - Model showing expected return on a customer/prospect over a defined amount of time
    - How many customers/prospects return, how often, and how much do they spend
- **Payback**
  - Expected customer/prospect return based on the investment made to get the customer/prospect to buy

Investment Pyramid



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2. How should you invest ?

- A value system will define how much you should spend (or can afford to spend) on a customer/prospect but it does not define;
  - What an individual customer /prospect will respond to
  - What channel is most appropriate for an individual business (mail, phone, e-mail, web, field sales, retail store etc)
  - What product(s) is(are) of most interest to the customer/prospect
- Predictive statistical response models accurately target customers/prospects with the channel and product that best suits each business/individual

3. Test Design

- Channel, product , offer and frequency tests

- We conduct tests ranging from the very basic test vs control (proper sample size calculation, ensuring correct measures are in place, randomization of file etc) to the more advanced MVT (multi-variate test) design (testing multiple factors and the interaction of them in a single test run)

4. Campaign / Market performance analysis

- Test vs. control results
- MVT test design results
- Market trending reports , seasonality
- Executive summaries
  - What do the results mean ?
  - What are clear actions can you take from the results ?
- We run results within DataMaApp or set up automatic ‘scorecards’ which update right at the customer’s site

Marketing and Experimental Designs

Company A wants to improve response rates and average order value on their marketing campaigns and attempts to do so testing 5 different marketing mailings to see which provides response and AOV improvements;

1. **Offer A**
2. **Offer B**
3. **Creative A**
4. **Creative B**
5. **Longitudinal mailing teaser (3 pieces related to each other (themed) mailed in succession)**

Marketing and Experimental Designs

Additionally there is interest in measuring 4 interactions;

1. **Offer A with teaser**
2. **Offer B with teaser**
3. **Creative A with teaser**
4. **Creative B with teaser**

Marketing and Experimental Designs

Typical test design answer

Set up nine test groups and compare them to each other and a control. Let's say 16,000 per cell is needed for statistical significance;

1. Offer A
2. Offer B
3. Creative A
4. Creative B
5. Longitudinal mailing teaser (3 pieces related to each other (themed) mailed in succession)
6. Offer A with teaser
7. Offer B with teaser
8. Creative A with teaser
9. Creative B with teaser

Marketing and Experimental Designs

Additionally each piece costs $4 to implement.

Test Run	Volume	Total Cost
1	16,000	$ 64,000
2	16,000	$ 64,000
3	16,000	$ 64,000
4	16,000	$ 64,000
5	16,000	$ 64,000
6	16,000	$ 64,000
7	16,000	$ 64,000
8	16,000	$ 64,000
9	16,000	$ 64,000
Total	**144,000**	**$ 576,000**

Marketing and Experimental Designs

Test design using fractional factorial designs

We could also set up this test using an experimental design. An experimental design consists of a series of runs, where each run receives a specified treatment (or combination of treatments). In this case – with two levels and 5 factors (the things we are testing) we would need;

2^5 = 32 runs for a full factorial design

levels

factors

Marketing and Experimental Designs

Test design using fractional factorial designs

To test 5 factors with two levels and their interactions you would need $2^5 = 32$ runs – still very large and costly to implement

A fractional design dramatically cuts down the number of runs needed (and hence cost and complexity) by setting up designs that measure the main effects and interactions you want but losing the ones you don't – for example 3 way interactions and 2 way interactions you would never implement – these are called confounding interactions

Marketing and Experimental Designs

Test design using fractional factorial designs

In our example we have 5 factors each with 2 levels – typically 32 runs . Here are two sample fractional designs we could use instead

2^{5-1} - ½ of a 2 level 5 factor design – requires 16 runs

Main effect confounders

1 + 2345
2 + 1345
3 + 1245
4 + 1235
5 + 1234

Marketing and Experimental Designs

Test design using fractional factorial designs

2^{5-2} – ¼ of a 2 level 5 factor design – requires only 8 runs

Main effect confounders

1 + 24 + 35 + 12345
2 + 14 + 345 + 1235
3 + 15 + 245 + 1234
4 + 12 + 235 + 1345
5 + 13 + 234 + 1245

Marketing and Experimental Designs

Test design using fractional factorial designs

In our example I choose to run the 2^{5-1} fractional design because all 5 main effects are confounded with 4 way interactions only (the 4 way interactions is what we will not be able to measure) and no 2 way interactions

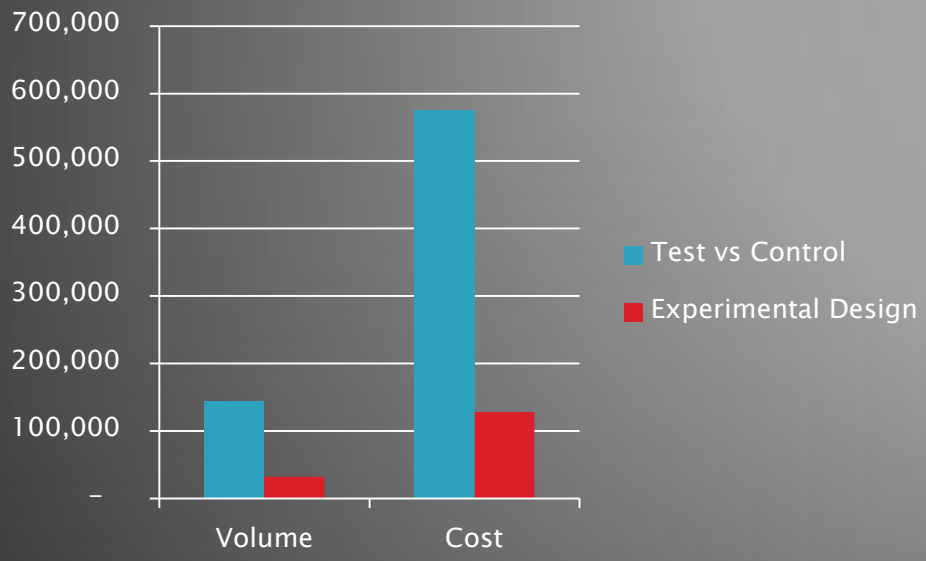
Marketing and Experimental Designs

Now lets use the experimental design

Set up 16 test runs using a 2^{5-1} fractional factorial design. The design is below;

Run	Volume	OfferA	Offer B	Creative A	Creative B	Teaser	Total Cost
1	2000	0	0	0	0	1	$ 8,000
2	2000	1	0	0	0	0	$ 8,000
3	2000	0	1	0	0	0	$ 8,000
4	2000	1	1	0	0	1	$ 8,000
5	2000	0	0	1	0	0	$ 8,000
6	2000	1	0	1	0	1	$ 8,000
7	2000	0	1	1	0	1	$ 8,000
8	2000	1	1	1	0	0	$ 8,000
9	2000	0	0	0	1	0	$ 8,000
10	2000	1	0	0	1	1	$ 8,000
11	2000	0	1	0	1	1	$ 8,000
12	2000	1	1	0	1	0	$ 8,000
13	2000	0	0	1	1	1	$ 8,000
14	2000	1	0	1	1	0	$ 8,000
15	2000	0	1	1	1	0	$ 8,000
16	2000	1	1	1	1	1	$ 8,000
Total	32000	16000	16000	16000	16000	16000	$ 128,000

Comparison test and control vs. experimental design



	Test vs Control	Experimental Design
Volume	144,000	32,000
Cost	$ 576,000	$ 128,000

Marketing and Experimental Designs

How is this done in SAS?

Experimental design structure set up in a sas dataset
Post campaign results analyzed using proc glm

Marketing and Experimental Designs

Sample Results from SAS output – main effects

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

offera	dollarperbuyer LSMEAN	H0:LSMean1=LSMean2
		Pr > |t|
0	153.055387	<.0001
1	221.277211	

teaser	dollarperbuyer LSMEAN	H0:LSMean1=LSMean2
		Pr > |t|
0	93.514417	<.0001
1	280.818182	

Marketing and Experimental Designs

Sample Results from SAS output – interaction effects

The GLM Procedure

Least Squares Means

Adjustment for Multiple Comparisons: Tukey

creativea	teaser	dollarperbuyer LSMEAN	LSMEAN Number
0	0	95.028985	1
0	1	262.129738	2
1	0	91.999848	3
1	1	299.506626	4

Least Squares Means for effect creativea*teaser

Pr > |t| for H0: LSMean(i)=LSMean(j)

Dependent Variable: dollarperbuyer

i/j	1	2	3	4
1		<.0001	0.4206	<.0001
2	<.0001		<.0001	<.0001
3	0.4206	<.0001		<.0001
4	<.0001	<.0001	<.0001	

Thank You

Questions ?