Experiment design with Sales teams

Context

This experiment is needed because understanding the impact of marketing efforts on product adoption is crucial for the success of any business. Email marketing is a cost-effective and widely used method for promoting products and services, but its effectiveness can vary depending on the content, frequency, and timing of the emails. By conducting this experiment, we hope to gain a better understanding of how marketing emails can be used to increase product adoption and inform future marketing strategies. Additionally, this experiment will help us to confirm that our marketing efforts are driving adoption or not.
Based on the results marketing campaigns can be optimized to increase the return on investment.

Opportunity

There are several opportunities that can arise from performing this experiment.

- Firstly, it can provide valuable insights into what types of marketing emails are most effective in driving product adoption. This information can be used to optimize future marketing efforts and improve the overall performance of the product.
- Secondly, the experiment can also help identify any potential roadblocks or pain points that may be preventing customers from adopting the product. By understanding these issues, the company can make changes to the product or marketing strategy to overcome them.
- Additionally, the A/B experiment can help to increase the ROI of the marketing budget by identifying the most effective marketing emails, which can lead to more conversions and sales.

Overall, an A/B experiment can provide valuable insights and help to optimize the product and marketing strategy to increase product adoption.

Assumptions & Risks

- Risks include the possibility that the experiment may fail to show any significant difference between the control group and test group, which can lead to wasted resources and no actionable insights.
- Additionally, there is the risk that the variation of the marketing emails could lead to a decrease in product adoption, which could harm the company's revenue and reputation.

Hypothesis

- *H_0: Marketing emails have no significant effect on product adoption*
- *H_1: Marketing emails show a significant effect on product adoption*

Experiment Design

	Description
Type of Test	A/B Test
Hypothesis (H0)	“Outbound marketing has no impact on product conversion”
Audience	All customers that joined less than 12 months
Region	All regions
Intended Start Date	January 01, 2023
Test Timeline	2 months
Business Opportunity	Every % in product adoption increase leads to appx. $50M incremental revenue.
Experiment Split	Control:Test = 50%:50%
Required sample size	1.000*
Control group	Do not proactively engage with customers
Treatment group	Get send one email with personalised product recommendations
Primary KPI	Product conversion rate: [# of customers with at least 1 product adopted / # of customers in Audience]
Analytical framework	Bayesian & frequentist analysis

Scope

The experiment will run at a large scale in all regions. All customers with a tenure of less than 12 months and more than 10 purchases will be targeted. Only customers with less than 2 adopted products will be considered. The marketing team will only receive the email addresses of the treatment group and no other information.

Sizing

The average global product adoption rate is 8.3%.

There will be about 3.000 leads in the experiment population per month. 50% of these leads will be targeted by marketing

Therefore 5% is the baseline conversion rate. The table below illustrates sample size requirements for various scenarios (assuming a significance level of 5%):

% Increment (absolute)	Observed conversion rate	Incremental adopted products per month	Incremental revenue annually	Sample size requirement (significance = 5%)	Sample size requirement (significance = 10%)	Experiment duration
4%	4% + 8.3% = 12.3%	120	$1.3M	300 samples per variant	160 samples per variant	2 month (α=5%) 1.5 month (α=10%)
2%	2% + 8.3% = 10.3%	60	$650k	1.2k samples per variant	900 samples per variant	14 months (α=5%) 10 months (α=10%)

Success Metric

- Incremental revenue
    - Calculated by subtracting the control group revenue from the treatment group revenue
- Product adoption rate
    - Comparing the number of adopted products divided by all contacted customers for control and treatment group

Analytical Framework

- In the Bayesian approach, a prior probability distribution is used to represent the uncertainty of the parameter of interest. This prior distribution is then updated based on the data collected during the experiment, resulting in a posterior distribution that represents the updated level of uncertainty. This approach allows for more flexibility in the analysis and can be useful in cases where the sample size is small or the data is highly variable.

- In the frequentist approach, the data is analysed using statistical tests such as t-tests or chi-squared tests. These tests are used to determine if there is a significant difference between the control group and the test group in terms of product adoption. The frequentist approach is more traditional and widely used in experimental design and provides p-values which indicate the level of significance of the results.

Operationalization

- Leads are created monthly and served via a CSV file that is sent via mail to the marketing managers
- All customers will receive the mails at the same local time (e.g. always at 9am which depends on the different time zones)