



FAST FOOD CHAIN ANALYSIS

Marketing Campaign Testing Using Analytics Tools

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BACKGROUND & DATA OVERVIEW

A fast-food chain plans to add a new item to its menu. As a the data analvst working for this fast-food chain company. This company is still undecided between the three possible marketing campaigns for promoting the new product. In order to determine which promotion has the greatest effect on sales, the new item is introduced at locations in several randomly selected markets. A different promotion is used at each location, and the weekly sales of the new item are recorded for the first four weeks.

[LINK TO DATASET](#)



OBJECTIVES

- Finds out which marketing campaigns bring greatest effect on sales by comparing three market size using Hypothesis Testing
- Predict future outcome by analyzing the effect of Market age and size

SKILLSET :

- Exploratory Data Analysis
- Hypothesis Testing on Market Size
- Hypothesis Testing on Promotions
- Insight and Recommendations

TOOLS :



DATASET OVERVIEW

All of these variables are beneficial for the modeling process. I will set sales in thousands as our target variable and analyze to see what variables contribute the most to sales.

Our data set consists of 548 entries including :

Variables	Definition
Location ID	Unique identifier for store location. Each location is identified by a number
Promotion	One of three promotions that were tested (1, 2, 3). We don't really know the specifics of each promotion
Sales in Thousand	Sales amount for a specific LocationID, Promotion and week.
Market Size	There are three types of market size: small, medium and large





CHARACTERISTIC OF EACH MARKET SIZES

Characteristic of each market size will be defined by :

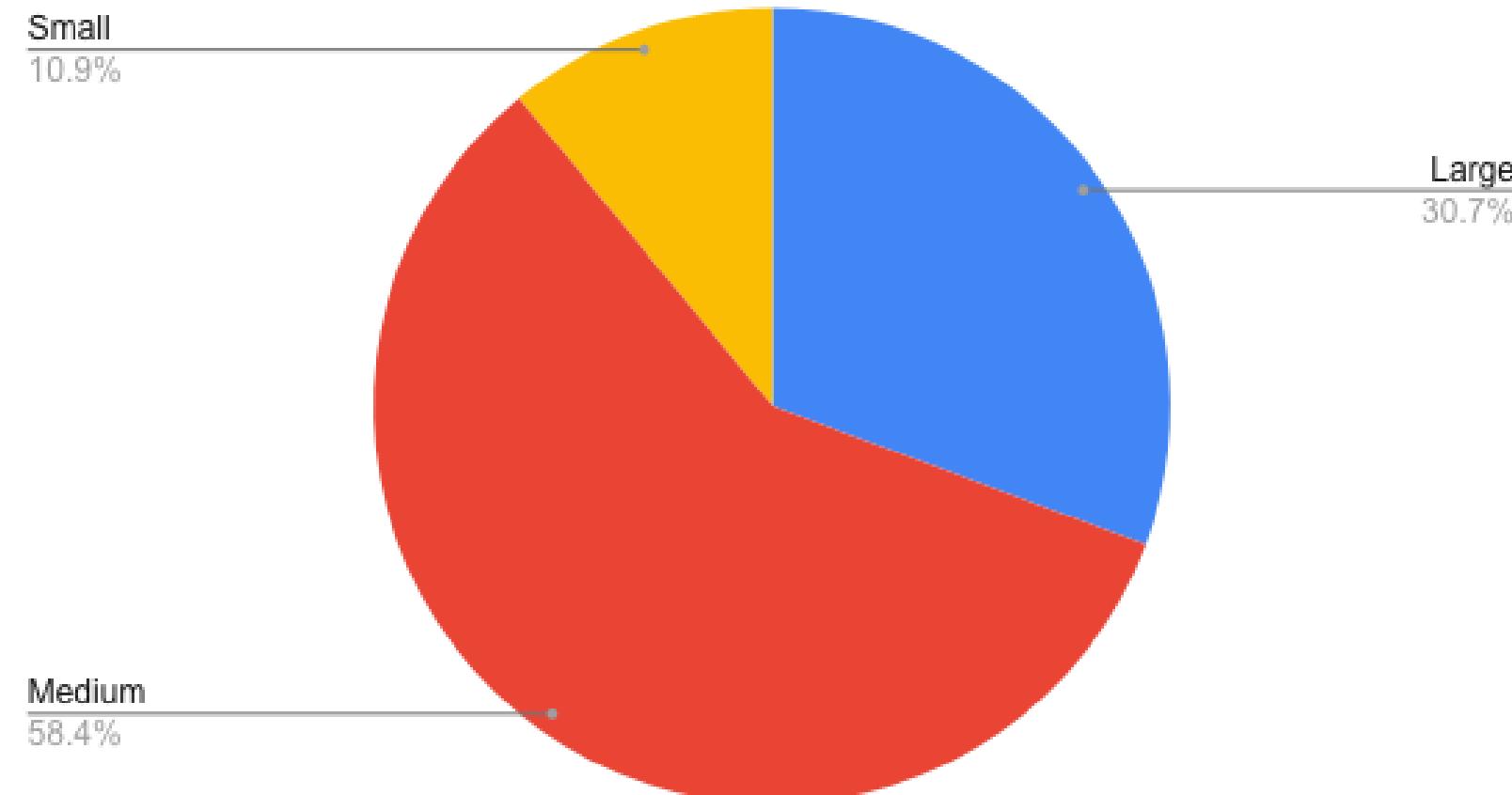
- Total Store for each Market Size
- Total Sales for each Market Size
- Total Sales for each Promotions



TOTAL STORE FOR EACH MARKET SIZE



Total Store of Market Size

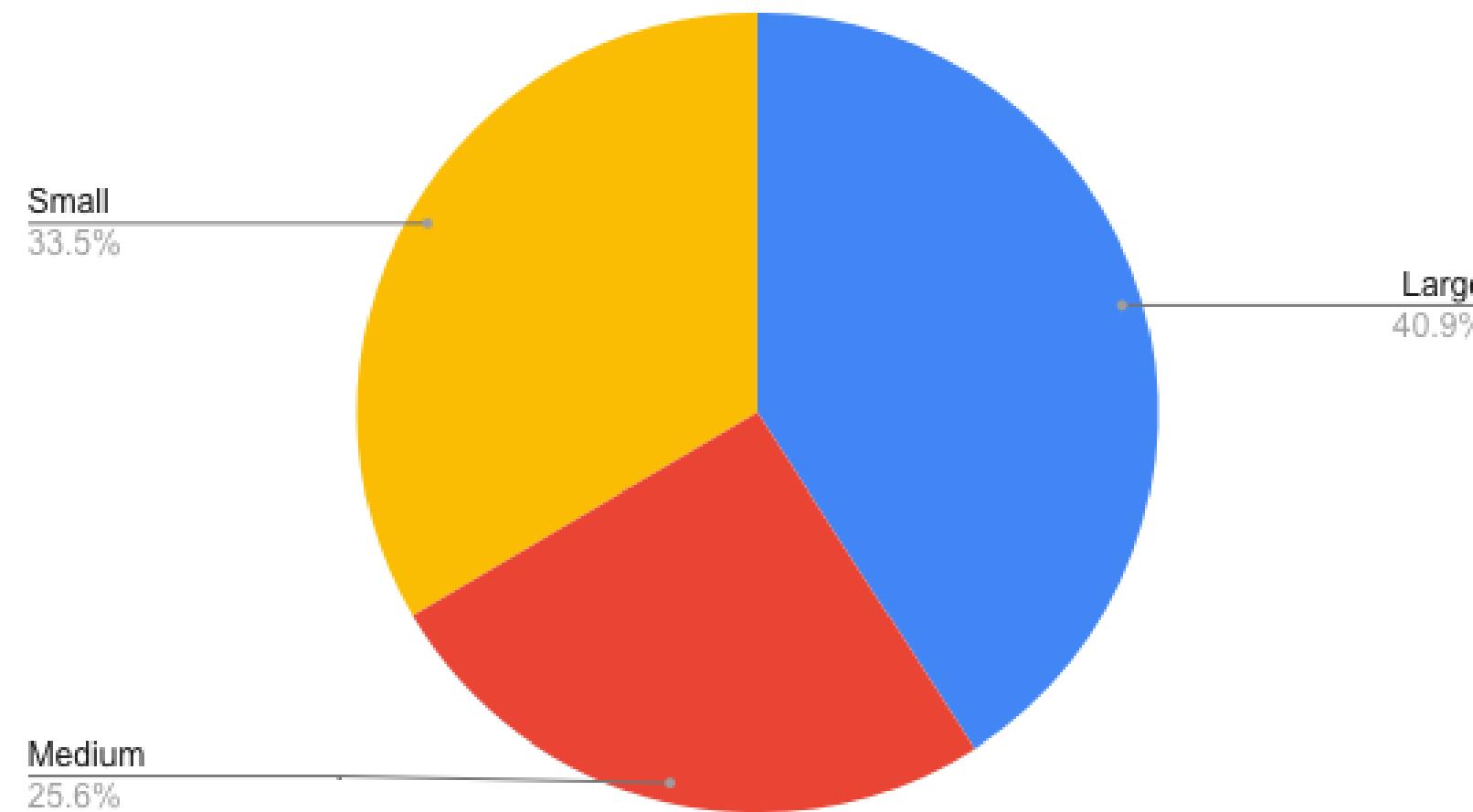


Market size - Medium is dominating by percentage **58.4%** compared to others market sizes

>>>>>

TOTAL SALES FOR EACH MARKET SIZE

AVERAGE of SalesInThousands



Market size - Large is dominating by percentage **40.9%** for average of total sales compared to other market size.



>>>>>

TOTAL SALES FOR EACH PROMOTIONS IN EVERY MARKET SIZES

MarketSize	Promotion	SalesInThousands
Large	1	4213.21
	2	3860.61
	3	3705.79
Medium	1	4576.57
	2	4224.35
	3	5274.39
Small	1	1203.25
	2	812.97
	3	1428.34

Promotion 1 are having the most highest sales in **Large** market size.
Meanwhile **Promotion 3** is dominating in **Medium** and **Small** market size.

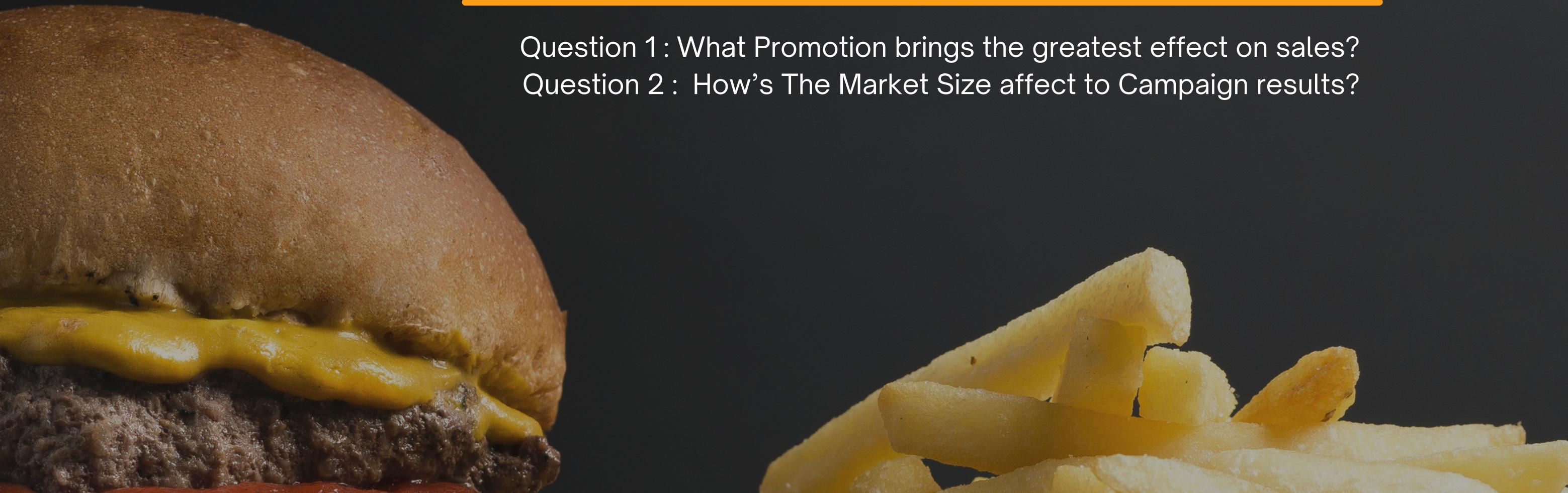


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PROMOTION AND MARKET SIZE EFFECT ON SALES

Question 1: What Promotion brings the greatest effect on sales?

Question 2 : How's The Market Size affect to Campaign results?



50%
OFF

WHAT PROMOTION BRINGS THE GREATEST EFFECT ON SALES?

To determine the effect of each promotion towards sales, we assumed using **T-test** that each promotion give higher impact than the others which categorized below :

- A. Promotion 1 giving higher impact than **Promotion 2**
- B. Promotion 2 giving higher impact than **Promotion 3**
- C. Promotion 3 giving higher impact than **Promotion 1**



A. IS PROMOTION 1 GIVE HIGHER IMPACT THAN PROMOTION 2?

t-Test: Two-Sample Assuming Equal Variances		
	Promotion 1	Promotion 2
Mean	58.17830409	47.43379679
Variance	274.55184	227.4484473
Observations	171	187
Pooled Variance	249.9416405	
Hypothesized Mean Difference	0	
df	356	
t Stat	6.423097915	
P(T<=t) one-tail	0.0000000021393	
t Critical one-tail	1.649145045	
P(T<=t) two-tail	0.0000000042787	
t Critical two-tail	1.966649924	

Hypothesis :

H0 : Promotion 1 \leq Promotion 2
H1 : Promotion 1 $>$ Promotion 2

Rejection region H0 :

T Stat > T Critical

(6.42 > 1.65)



P Value < Alpha threshold

(.00213 < 0.05)



Reject H0

Summary :

Promotion 1 give higher impact than Promotion 2



B. IS PROMOTION 2 GIVE HIGHER IMPACT THAN PROMOTION 3 ?

t-Test: Two-Sample Assuming Equal Variances		
	Promotion 2	Promotion 3
Mean	47.43379679	55.48016043
Variance	227.4484473	280.087964
Observations	187	187
Pooled Variance	253.7682056	
Hypothesized Mean Difference	0	
df	372	
t Stat	-4.88412597	
P(T<=t) one-tail	0.00000077290432	
t Critical one-tail	1.648960002	
P(T<=t) two-tail	0.00000154580864	
t Critical two-tail	1.966361431	

Hypothesis :

H0 : Promotion 2 \leq Promotion 3
H1 : Promotion 2 $>$ Promotion 3

Rejection region H0 :

T Stat > T Critical

(-4.884 < 1.65)

P Value < Alpha threshold

(.00213 < 0.05)

Accept H0

Summary :

Promotion 2 does not give higher impact than Promotion 3



C. IS PROMOTION 3 GIVE HIGHER IMPACT THAN PROMOTION 1 ?

t-Test: Two-Sample Assuming Equal Variances		
	Promotion 3	Promotion 1
Mean	55.48016043	58.17830409
Variance	280.087964	274.55184
Observations	187	171
Pooled Variance	277.4443093	
Hypothesized Mean Difference	0	
df	356	
t Stat	-1.530927079	
P(T<=t) one-tail	0.06333775333	
t Critical one-tail	1.649145045	
P(T<=t) two-tail	0.1266755067	
t Critical two-tail	1.966649924	

Hypothesis :

H0 : Promotion 3 \leq Promotion 1
H1 : Promotion 3 $>$ Promotion 1

Rejection region H0 :

T Stat > T Critical ($-1.53 > 1.65$) **X**

P Value < Alpha threshold ($0.06 > 0.05$) **X**

Accept H0

Summary :

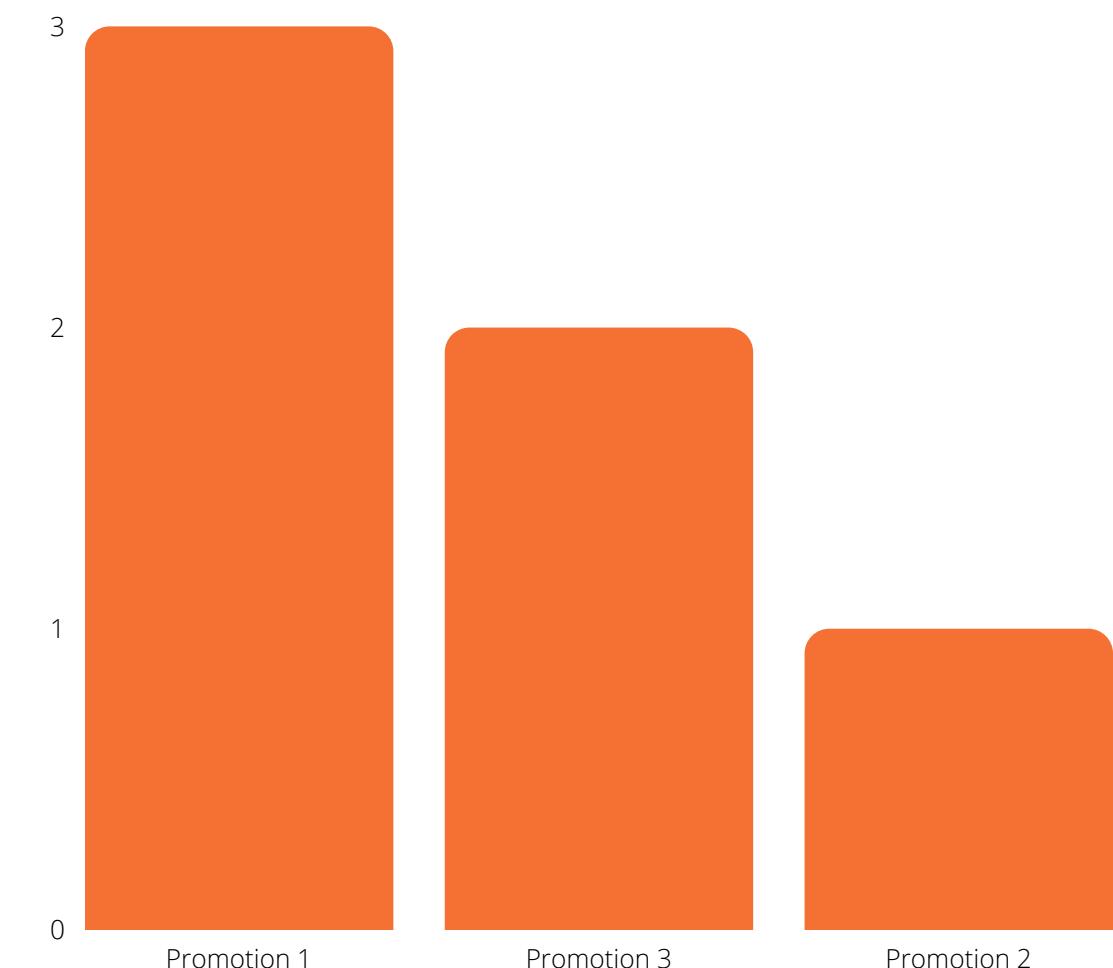
Promotion 3 does not give higher impact than Promotion 1

CONCLUSION

Based on the result of Hypothesis testing as we saw before, here is the result :

Promotion 1 > Promotion 3 > Promotion 2

Our hypothesis proved that the highest sales is generated by **Promotion 1**, followed by **Promotion 3**, and **Promotion 2** as the last.



SIZE
MATTER
?

HOW'S THE MARKET SIZE AFFECT TO CAMPAIGN RESULTS?

To determine the effect of each Market towards sales, we assumed using T-test that **each market doesn't have the same size** in which we categorize as:

- A. Market Size Small VS Market Size Medium
- B. Market Size Medium VS Market Size Large
- C. Market Size Large VS Market Size Small



A. MARKET SIZE SALES SMALL VS MEDIUM

t-Test: Two-Sample Assuming Equal Variances		
	Sales Small	Sales Medium
Mean	57.40933333	43.98534375
Variance	43.99803006	81.92745255
Observations	60	320
Pooled Variance	76.00725168	
Hypothesized Mean Difference	0	
df	378	
t Stat	10.94492797	
P(T<=t) one-tail	0	
t Critical one-tail	1.64889466	
P(T<=t) two-tail	0	
t Critical two-tail	1.966259562	

Hypothesis :

$H_0 : \text{Small} = \text{Medium}$

$H_1 : \text{Small} \neq \text{Medium}$

Rejection region H_0 :

T Stat > T Critical

($10.94 > 1.96$)



P Value < Alpha threshold

($0 < 0.05$)



Reject H0

Summary :

Market size small **does not have same size** as
Market Size Medium



A. MARKET SIZE SALES MEDIUM VS LARGE

t-Test: Two-Sample Assuming Equal Variances		
	Sales Medium	Sales Large
Mean	43.98534375	70.11672619
Variance	81.92745255	290.776009
Observations	320	168
Pooled Variance	153.6922857	
Hypothesized Mean Difference	0	
df	486	
t Stat	22.12361388	
P(T<=t) one-tail	0	
t Critical one-tail	1.647994915	
P(T<=t) two-tail	0	
t Critical two-tail	1.96485709	

Hypothesis :

$H_0 : \text{Medium} = \text{Large}$

$H_1 : \text{Medium} \neq \text{Large}$

Rejection region H_0 :

T Stat > T Critical ($22.1 > 1.96$) 

P Value < Alpha threshold ($0 < 0.05$) 

Reject H_0

Summary :

Market size Medium **does not have same size** as
Market Size Large



A. MARKET SIZE SALES LARGE VS SMALL

t-Test: Two-Sample Assuming Equal Variances		
	Sales Small	Sales Large
Mean	57.40933333	70.11672619
Variance	43.99803006	290.776009
Observations	60	168
Pooled Variance	226.3516693	
Hypothesized Mean Difference	0	
df	226	
t Stat	5.616004515	
P(T<=t) one-tail	0.000000028546	
t Critical one-tail	1.651623799	
P(T<=t) two-tail	0.000000057092	
t Critical two-tail	1.970516191	

Hypothesis :

H0 : Large = Small

H1 : Large != Small

Rejection region H0 :

T Stat > T Critical (5.61 > 1.97) 

P Value < Alpha threshold (.0057 < 0.05) 

Reject H0

Summary :

Market size Large **does not have same size** as
Market Size Small



CONCLUSION

Based on the result of Hypothesis testing as we saw before, here is the result :

Sales Market Small != Sales Market Medium != Sales Market Large

Our hypothesis proved that there's difference between Market size_Small, Market size_Medium, Market size_Large which impact on the result of Campaign



INSIGHT

- MARKET SIZE MEDIUM DOMINATED ABOUT 58.4% AMONGST ALL MARKET IN TOTAL STORE BUILT
- MARKET SIZE LARGE DOMINATED ABOUT 40.9% AMONGST ALL MARKET IN TOTAL AVERAGE SALES
- THE HIGHEST SALES IS GENERATED BY PROMOTION 1, FOLLOWED BY PROMOTION 3, AND PROMOTION 2 AS THE LAST.
- THERE'S DIFFERENCE BETWEEN MARKET SIZE SMALL, MARKET SIZE MEDIUM, MARKET SIZE LARGE WHICH IMPACT ON THE RESULT OF CAMPAIGN



RECOMENDATION



DO ROUTINE QUALITY CONTROL FOR MARKET IN MARKET SIZE LARGE AS PRIORITIES, SINCE IT HAS THE LARGEST QUANTITY OF MARKET



PLAN MARKETING STRATEGY TO IMPROVE PROMOTION 2 WHICH IS THE LOWEST ON SALES GENERATION





THANK YOU!

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