Irish Fest Milwaukee

Allocating monthly advertisement budget

Sidak Singh

Introduction

The Irishfest is a cultural heritage festival held annually since 1981. Through Irishfest, the rich Celtic culture is celebrated and shared with visitors from around the world. Irishfest passionately aims to preserve the history and tradition of Irish, Irish American, and Celtic cultures. The four-day-long fest is filled with food, music, parades, games, and activities celebrating the Celtic culture. Milwaukee Irish Fest is the world's largest celebration of Irish/Celtic music and culture, is held annually on the third weekend in August on the shore of Lake Michigan at the Henry W. Maier Festival Park, in Milwaukee, Wisconsin (Irishfest.com).

Problem

Even though Irishfest attracts a sizable crowd of about 100,000 visitors annually, the management recognizes that most of these visitors are “regular attendees” who have been attending the festival ever since they were children. These “regular attendees” are seen as “die-hard” fans of the Irishfest and require minimal to no advertisement directed specifically towards them for them to attend the festival. This is not the case with the younger attendees who have been attending in small numbers for the last few years and the management needs to advertise directly to them to ensure that they attend. The management is concerned about attracting the younger audience because once they attend for the first time because most of the first time Irishfest attendees continue attending the years following without much advertisement effort.

Objective

Given the information above, the management would like to determine the best way to allocate a monthly advertisement budget between four social media platforms. These four social media platforms are Facebook, Instagram, Twitter, and Snapchat. The management has decided to spend no more than 50 percent of the total budget on each social media platform. Since Facebook is the most

widely used social media platform, the management would like to allocate at least 25 percent of the budget towards it. Nuphoriq, a marketing company for caterers and event venues advises spending between 6 to 12 percent of total gross revenue towards marketing campaigns such as the one in question. The management would like to remain conservative and spend $90,000 or only 6 percent of the total gross revenue towards this advertisement campaign budget. A local research firm was employed to measure the young audience exposure for each of these social media platforms. The firm developed an index that measures exposure towards younger individuals every 1000 impressions, on a scale from 0 to 1000, with higher values implying higher younger audience exposure. These index values are shown in table 1 below along with the cost in CPM (Cost per thousand impressions) for each social media platform.

Table 1: Index (effectiveness in reaching young people) and Cost (CPM)

Platform	Index (0-1000)	Cost (CPM)
Facebook	10**0**	$9.06
Instagram	33**0**	$6.70
Twitter	20**0**	$5.76
Snapchat	30**0**	$20.00

Model

We construct a Linear Optimization model which tells us how the monthly budget should be allocated towards the four social media platforms to maximize the value of total exposure towards the young audience. Specifically, we obtain the optimal number of impressions to purchase on each social media platform which maximizes the total exposure towards young audience (per 1000 impressions). Impressions are the total number of times an ad content is displayed on a platform. Our decision variables are (F, I, T, S) which each represent the total number of impressions (in 000's) to purchase

on each social media platform. The objective function is shown below where the coefficients represent the number of exposures towards young individuals per one thousand impressions.

Let:

F = Impressions bought on Facebook advertising (000's)

I = Impressions bought on Instagram advertising (000's)

T = Impressions bought on Twitter advertising (000's)

S = Impressions bought on Snapchat advertising (000's)

***Max*:** ((100) F + (330) I + (200) T + (300) S)

S.t.

(9.06) F + (6.70) I + (5.76) T + (20) S ≤ 90,000	→	(Budget)
(9.06) F ≤ (.50) 90,000	→	(Max each)
(6.70) I ≤ (.50) 90,000		
(5.76) T ≤ (.50) 90,000		
(20) S ≤ (.50) 90,000		
(9.06) F ≥ (.25) 90,000	→	(Facebook)
F, I, T, S ≥ 0	→	(Non-negative)

Results

We use the Microsoft Excel and the solver function within to compute the IP (Integer Programing, where all the decision variables are an integer) model shown above. The spreadsheet used to calculate the results is shown at the end of the report along with the Answer Report (for the initial run). The results from the model show that the management can achieve exactly 3,245,750 exposures of young individuals given the current coefficients and constraints. The optimal number of impressions (000's) to buy on each social media platform is shown in table 2 below. The management can easily view the total cost of advertisement for each social media platform (Line 7 on spreadsheet and table 2). This makes it easy for them to acknowledge how much to spend on each social media platform, given the optimal number of impressions to purchase for each social media platform. One important thing to note from the results is that, the optimal solution is to not purchase any impressions on Snapchat. This would come as a surprise for individuals who would decide to spend significantly on Snapchat, given its effective ability to reach younger audiences.

Table 2: Optimal number of impressions (000's) to buy on each social media platform and total cost

Platform	Total Impressions to buy (000's)	Total Cost
Facebook	**2484**	**$22,505**
Instagram	**6715**	**$44,991**
Twitter	**3907**	**$22,504**
Snapchat	**0**	**$0**

What-if analysis

To evaluate two various scenarios and examine how the output variable (total exposures of young individuals) changes let's suppose that the management wants to change the constraints from the scenario. The management has just decided that advertising on Facebook is not particularly effective to reach younger audiences since most of the Facebook users are over the age of 30. So, the management would like to drop the requirement of spending at least 25 percent of the total budget on Facebook impressions. Also, the management has decided to be more liberal towards the budget for this campaign. They would like to know how many more exposures of young individuals (if possible) are achieveable by spending 10 percent or all of the suggested 12 percent of gross profit as suggested by Nuphoriq. This gives us two new scenarios, one where the RHS of the budget constraint is increased to $150,000 (10 percent of the gross profit) and the second where the RHS of the budget constraint is increased to $180,000 (12 percent of te gross profit). We drop the "Facebook" constraint (see the model above) which ensured that at least 25 percent of the total budget was to be allocated towards Facebook impressions. Since the total budget changes the maximum allowable spending (50 percent) will also increase, increasing the RHS of the all the "max each" constraints. When we run the model for both of these scenarios, we obtain the maximum number of impressions directed towards young individuals. Table 3 and 4 show the optimal values of the decision variables for both of these respective scenarios. In both of these scenarios, the optimal decision involves not buying any impressions on Facebook. Also, we can achieve a higher number of impressions of young individuals as the budget increases (Table 5). In the end, it would the management's decision to decide how much to allocate towards the budget based upon their target of young impressions to achieve. Linear programing allows us to evaluate large number of combinations and achieve the optimal value of decision variables which maximize the total impressions of the young, something which is impossible to calculate manually and very hard to "guess".

Table 3: Optimal decisions for Scenario 1 when budget: $150,000 (10 percent of the gross profit)

Platform	Facebook	Instagram	Twitter	Snapchat
Total i**mpressions** to buy **(000's)**	**0**	**11194**	**13020**	**0**
Total Cost	**$0**	**$75,000**	**$74,995**	**$0**

Table 4: Optimal decisions for Scenario 1 when budget: $180,000 (12 percent of the gross profit)

Platform	Facebook	Instagram	Twitter	Snapchat
Total i**mpressions** to buy **(000's)**	0	13432	15625	0
Total Cost	$0	$89,994	$90,000	$0

Table 5: Total impressions of young individuals achieved based on the amount of budget

Budget	**Young Impressions**
$90,000	3,245,750
$150,000	6,298,020
$180,000	7,557,560

Spreadsheet and Answer Report of the base model

	A	B	C	D	E	F	G	H	I	J	K
1											
2	**Platform**		**Facebook**	**Instagram**	**Twitter**	**Snapchat**	**TOTALS**				
3	Impressions (000's)		2484	6715	3907	0					
4	Index (0-100)		100	330	200	300					
5	Young Exposure		248400	2215950	781400	0	3245750				
6	Cost (CPM)		$9	$7	$6	$20					
7	**Total Cost**		$22,505	$44,991	$22,504	$0	$90,000	≤	90000	Budget	**Constraints**
8							$22,505	≤	45000	Max Each	
9							$44,991	≤	45000	Max Each	
10							$22,504	≤	45000	Max Each	
11							$0	≤	45000	Max Each	
12							$22,505	≥	22500	FB	

Answer Report:

Objective Cell (Max)

Cell	Name	Original Value	Final Value
$G$5	Young Exposure TOTALS	0	3245750

Variable Cells

Cell	Name	Original Value	Final Value	Integer
$C$3	Impressions (000's) Facebook	0	2484	Integer
$D$3	Impressions (000's) Instagram	0	6715	Integer
$E$3	Impressions (000's) Twitter	0	3907	Integer
$F$3	Impressions (000's) Snapchat	0	0	Integer

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$G$12	TOTALS	$22,505	$G$12>=$I$12	Not Binding	$5
$G$7	Total Cost TOTALS	$90,000	$G$7<=$I$7	Not Binding	0.14
$G$8	TOTALS	$22,505	$G$8<=$I$8	Not Binding	22495
$G$9	TOTALS	$44,991	$G$9<=$I$9	Not Binding	9.5
$G$10	TOTALS	$22,504	$G$10<=$I$10	Not Binding	22495.7
$G$11	TOTALS	$0	$G$11<=$I$11	Not Binding	45000
$C$3:$F$3=Integer					

Sources

1. N. (2019, December 12). How Much Should You Be Spending on Marketing? Retrieved June 23, 2020, from https://nuphoriq.com/create-a-marketing-budget/
2. York, A. (2020, May 15). Reach vs Impressions: What's the Difference in Terms? Retrieved June 23, 2020, from https://sproutsocial.com/insights/reach-vs-impressions/
3. The World's Largest Celebration of Celtic Music & Culture. (n.d.). Retrieved June 23, 2020, from https://irishfest.com/Milwaukee-Irish-Fest