MBAS906: CAPSTONE PROJECT

BUSINESS REPORT

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Student ID: 6956361

About the Company

Pace Consulting Group has 20 years of experience in working closely with more than 70 clients, striving to give best possible data driven solutions for the clients to grow. Our diverse team of experts are passionate and eager to bring the change through the integrated solutions, modern technology, and designs.

We at Pace strongly believe that best ideas come by working closely with the clients and believing in a transformational approach aimed at benefiting the stakeholders, empowering the organisation, and driving sustainable solutions for the competitive advantage.

About the Team

Chinmay Datar: Been with Pace Consulting Group for the past 4 years in capacity of a Business Analyst. He has worked on data analysis projects with other clients of Pace. He has expertise in handling big data sets and finding crucial patterns and finding an appropriate solution which can be acceptable to all the parties involved. He is also pursuing his master's in business analytics to further enhance his skills and keep up with modern technological advances.

Terms and Conditions

This business report is the intellectual property of Pace Consulting Group and NMSS and will be confidential. Any changes made to the report will be notified to the client with immediate effect. By signing this, the client agrees to the term and conditions and will be held accountable for any breach in the contract.

Acknowledgement

I would like to thank my colleague Shruti Jawale for her invaluable contribution with research and brainstorming for project proposal and project presentation I would also like to thank our faculty Dr. Martin Gold for providing guidance throughout the project and helping to finish the project in time. Lastly, I would like to thank all the faculty members of Business Analytic to share their valuable knowledge and constructive feedbacks.

Executive Summary

Multiple Sclerosis is neurodegenerative disease that affects the brain, spinal cord, and optic nerves of the body. The protective coating of the nerve fibres is damaged and eventually destroyed. Our client National Multiple Sclerosis Society (NMSS) is a leading non-profit organisation who spread awareness about MS, campaign for political reforms, organise donation drives to fund research to cure MS and support individuals affected with MS and their family members across the country.

This report is made NMSS by Pace Consulting Group. NMSS has provided the data of their Bike MS campaigns from 2013 to 2017. Pace Consulting has employed the methodology which best fit the client's problem statement to provide them with a data driven solution.

Pace Consulting group has used different forms of analytics in order to find the root cause of reduced number of participants and donations at NMSS' Bike MS events over the years, giving crucial insights with data visualisation tools such as SAS.

The report concludes with key findings and recommendations for NMSS' Bike MS event to gain higher number of participants and donation amounts in future.

Table of Contents

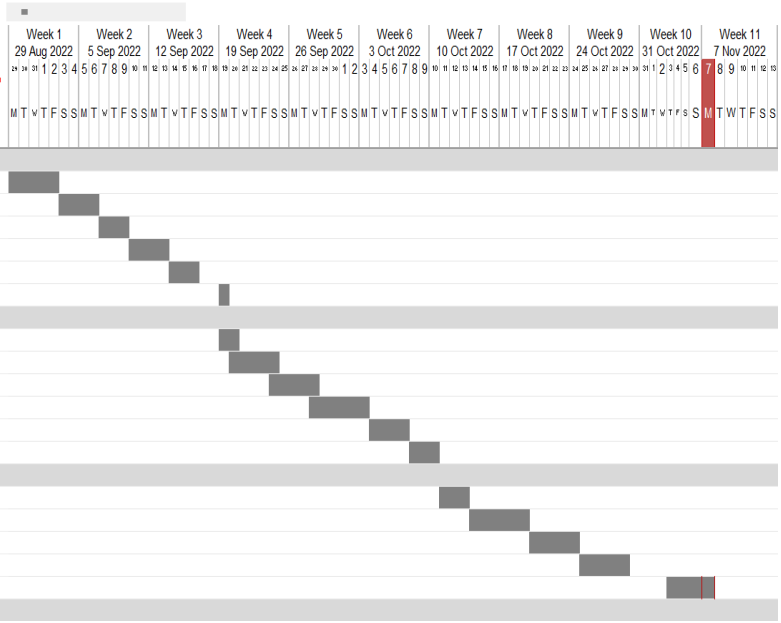
Project Timeline

The project was spread across 10 weeks to complete. The project was divided into three parts: Project proposal, Project presentation and Project report. The project was split into subcategories to meet project deadline. The Gantt chart below shows a breakdown of the 10week timeline that was followed to complete the project in time.

Pace Consulting Group

Project Start Date 8-29-2022 (Monday) Display Week 1

WBS	TASK	START	END	DAYS	% DONE	WORK DAYS
1	**Project Proposal**		-			-
1.1	Business Research Background	Mon 29-8-2022	Fri 02-9-2022	5	100%	5
1.2	Theoretical Framework	Sat 03-9-2022	Tue 06-9-2022	4	100%	2
1.3	Forming Problem Statement	Wed 07-9-2022	Fri 09-9-2022	3	100%	3
1.4	Methodology	Sat 10-9-2022	Tue 13-9-2022	4	100%	2
1.4.1	Develop KPIs	Wed 14-9-2022	Fri 16-9-2022	3	100%	3
1.4.2	Submit Proposal	Mon 19-9-2022	Mon 19-9-2022	1	100%	1
2	**Project Presentation**		-			-
2.1	Accessing the data	Mon 19-9-2022	Tue 20-9-2022	2	100%	2
2.2	Data cleaning	Tue 20-9-2022	Sat 24-9-2022	5	100%	4
2.3	Descriptive Analysis	Sat 24-9-2022	Wed 28-9-2022	5	100%	3
2.4	Data Visualisation	Wed 28-9-2022	Mon 03-10-2022	6	100%	4
2.5	Developing insights and forming dr	Tue 04-10-2022	Fri 07-10-2022	4	100%	
2.6	Presentating to the client	Sat 08-10-2022	Mon 10-10-2022	3	100%	1
3	**Project Report**		-			-
3.1	Forming questions and objectives	Tue 11-10-2022	Thu 13-10-2022	3	100%	3
3.2	Developing final data models and c	Fri 14-10-2022	Wed 19-10-2022	6	100%	4
3.3	Finding key insights	Thu 20-10-2022	Mon 24-10-2022	5	100%	3
3.4	Conclusion and Recommendations	Tue 25-10-2022	Sun 30-10-2022	6	100%	4
3.5	Final Submission	Thu 03-11-2022	Mon 07-11-2022	5	100%	3



Introduction

Business Research Background

There are many diseases that do not have a cure in the 21st century. There are non-profit organisations that help spread awareness about these diseases and raise funds for research and charity to help the diseased. Organisations host sporting events which function as an essential catalyst for charities as they promote an active lifestyle, a platform to collect donations and increase brand campaign exposure. These sporting events can be a cycling, running, swimming and the participants are usually friends, families, co-workers of someone diagnosed with the disease.

Our client, National Multiple Sclerosis Society (NMSS) hosts sporting events which involve walking (Walk MS) and cycling (Bike MS) (Get Involved 2015) to raise funds for studies and promoting awareness about MS. Multiple Sclerosis (MS) is a chronic neuro degenerative disease that limits the physical and cognitive functioning. NMSS was established in 1946. They host over 100 bike events each year and they have raised over $100 billion dollars for MS research since 1980 (Fasczewski et al. 2020, p. 100853). According to studies four times more women have MS than men (Harbo, Gold & Tintoré 2013, p. 237) and is usually diagnosed between the age of 20 and 40 (Małecka et al. 2021, p. 387). Exact cause of MS is still unclear, but it is maybe a combination genetic and environmental factors. There are currently about 400,000 people diagnosed with MS (Dilokthornsakul et al. 2016, p. 1014).

Bike MS is a one- or two-day event where NMSS raises funds by contributions from individuals and groups which are the primary source of funding. Over 70,000 riders participate in Bike MS in 75 districts around USA. Teams contribute to 87% of the total funds raised in Bike MS. Since many more bike events have started taking place for a cause, Bike MS' market share has been steadily falling since 2013 as well as number of participants and funds.

Research Objective

As noted above, the objective of the report is to find the underlying cause for the decreasing cashflow and participation by finding correlation between participant background and their motivation to participate and donate to the charity as well as participants joining on behalf of a corporation who are key contributor of the NMSS fundraising campaigns. As the client has mentioned that the corporate teams are more valuable than other teams, this study is more focused towards corporate team participation and acquisition. The study examines the participants, teams, and events data of the Bike MS campaign.

Another important aspect that we shall be focusing on is the correlation between participant's occupation, employer, and gift amount to assist NMSS better plan future events and targeted campaigns to increase donation amount and participation rate.

Research Question

The main focus of this study is acquisition of corporate teams as corporate teams are seven times more valuable than other teams.

Keeping that mind, the key research questions is:

- How to acquire new corporate teams with 10 riders or more.
- Which organisations and profession benefit the charity the most.
- Which events are most appealing for the corporate teams and in which states.
- How can these common denominators be applied to future campaigns and events.

Based on these key questions the following problem statement is created:

Problem Statement

Problem Statement	Observation
Achieved Result	Between 2013 - 2017 the amount of funds raised went from $74.13 million to $61.25 million.
Disturbing Events	17% decline in funds raised, due to decline in participation rate.
Desired Results	Aim to increase participation to 80,000+ so as to increase donations and reach 100 million.
Key Question	What events are popular among the participating corporate teams and what campaigns gets the most response and benefits the charity?
Stakeholders	NMSS Financial Department, NMSS Marketing Department, President of NMSS, Local Communities, Donors, Beneficiaries of the services, Volunteers.
Constraints of the Solution	Funding has declined over the years along with the participation rate. Implementing strategies to attract participants and improve the amount of funds raised in the past years.
Decision Criteria	The donations will help fund the research for MS, thereby improving chances of better treatments for the disease.

Methodology

Market Research

The first step we took before looking at the data was to do market research. The research begins with learning about MS illness, charities, events, and participants. This is a crucial step in the study as this gives us an idea about what kind of market we are dealing with. We conducted our own research on our client and looked through journal articles for investigation. We concluded that most of the charities and sporting events benefit highly with involvement and contribution from corporate teams who donate more than other teams.

Data Access

The client has provided us with multiple datasets which contain data about events, donations, participants, teams, Bike MS advertisement reports. To tackle our problem, we found only four datasets to be useful which were events, participants, teams, and donations. After analysing the datasets, we found that the donations dataset is the main dataset that we require as it holds most of the information that we need. The other three datasets hold some key information that we will need in order to answer our questions.

Software Used

We used SAS Visual Analytics for visualising our data as it provides a versatile platform to visualise and run machine learning algorithms on the data.

Data Cleaning

The datasets provided were unstructured, had many null values, outliers and columns which did not serve any purpose. We cleaned the data in SAS, removing the null values, and columns that we don't require and only keeping values that we require for our analysis.

Data Transformation

We performed a few data transformations to better read and interpret the data during the analysis. We changed states to geographical variable from category. We also created a custom category to consolidate repeated categories in 'Participant's connection with MS' and 'Team Division'. We created a new calculated item to determine retention rate year over year.

Descriptive Analytics

To get an overview of the dataset we look at the variable statistics and distributions.

Participants distribution: Number of participants has been consistently dropping since 2014. 2013 and 2014 had the highest participation of about 79,000 riders. Number of participants reduced by about 22% from 2013 to 2017.

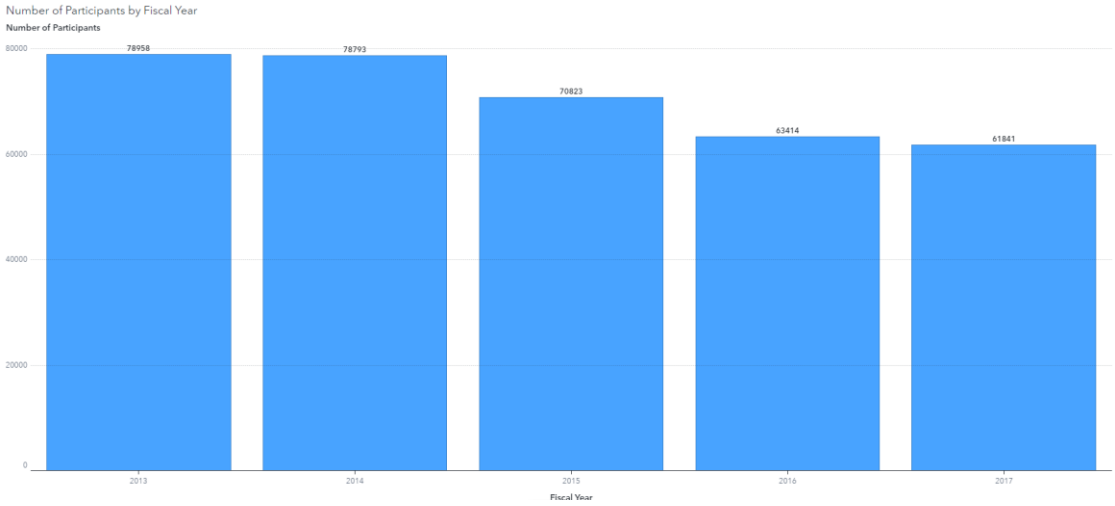


Figure 1 Participant Distribution

Gender Distribution: Only about 37% of the participants are females which is less than two third of the male participants.

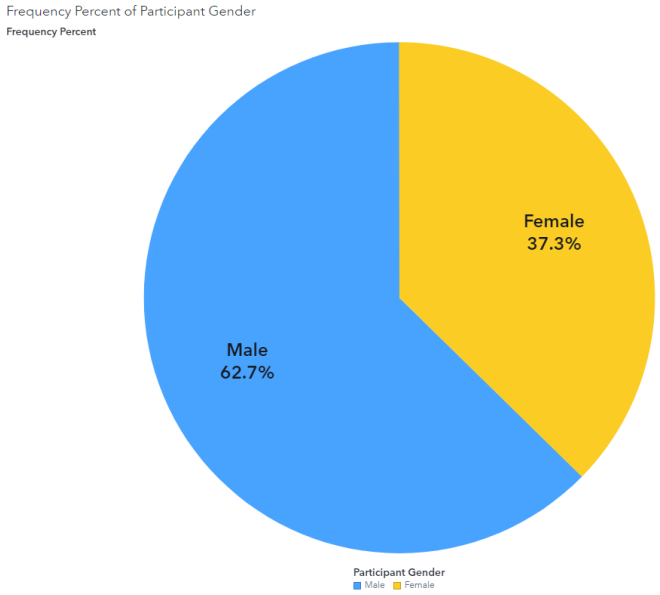


Figure 2 Gender Distribution

Participant's connection to MS: About 80% of the participants are friends and family of someone who has MS or they themselves have MS while only about 10% of participants have no connection to MS. Caregivers and care managers of someone with MS only make up for 0.1% of the participants taking part in the event.

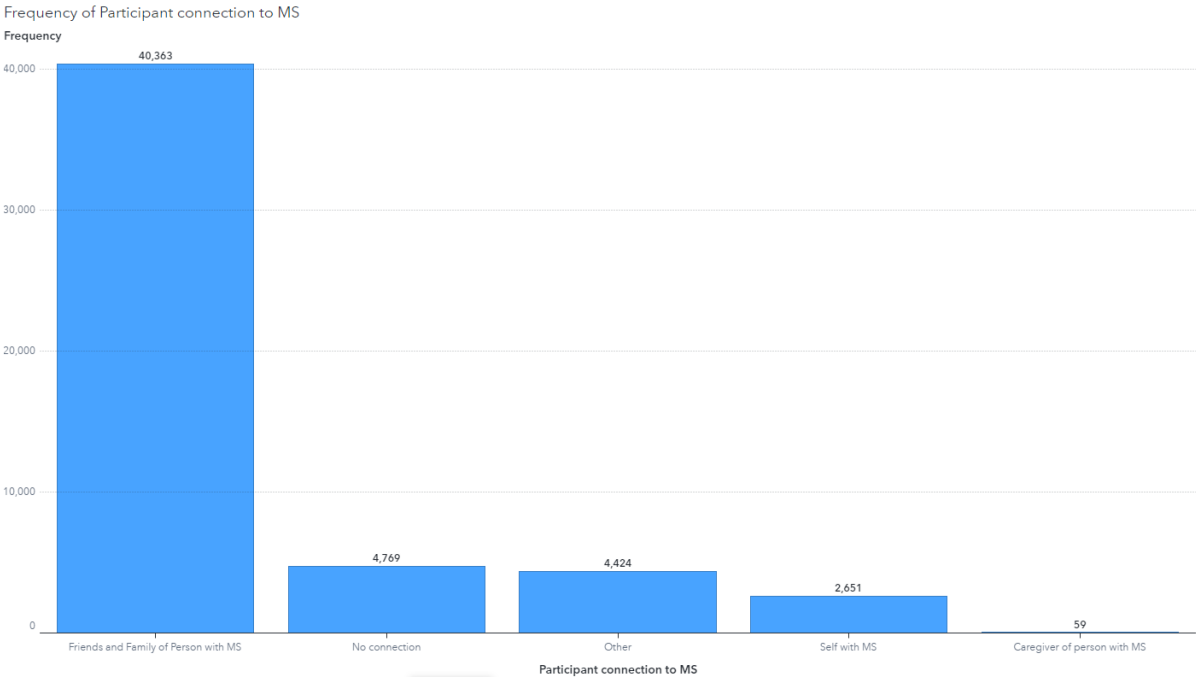


Figure 3 Participant's connection to MS

Participant's Occupation: More than 20% of the participants are either Healthcare or Engineering professionals. They are closely followed by IT, Sales and Executive/Management professionals making another 20% of the participants.

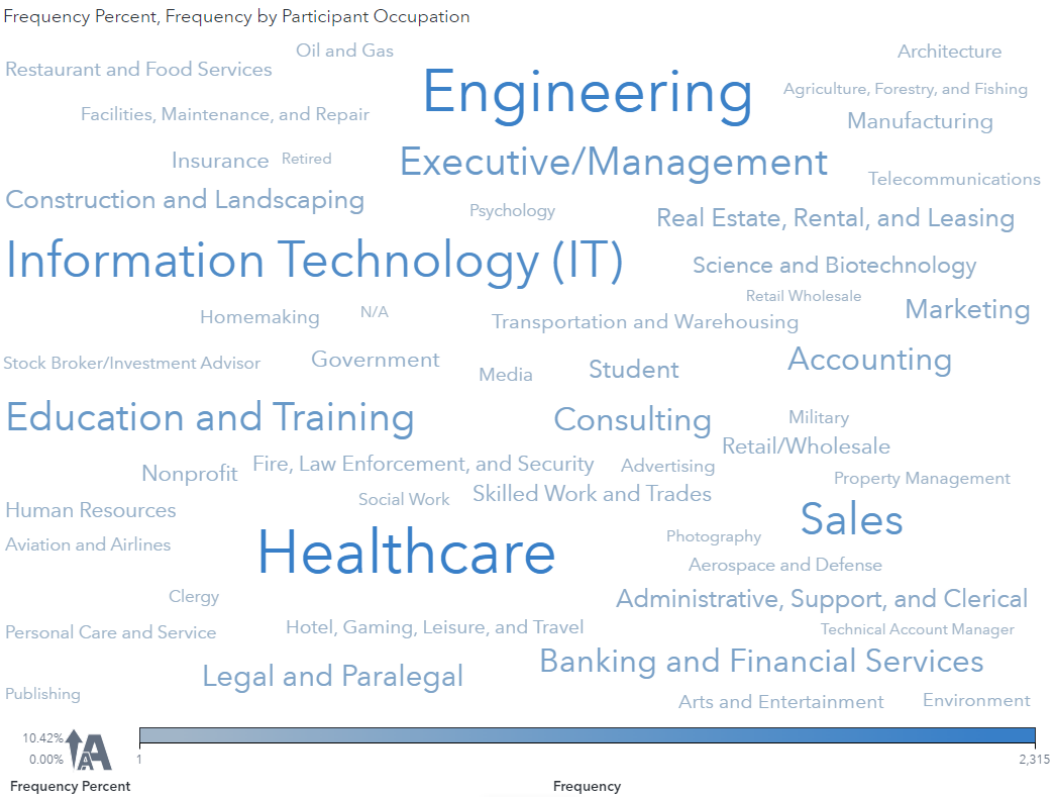


Figure 4 Participant's Occupation

The client has said that the retention rate is roughly 50%. We created our own variable to compare the retention rate year over year. The retention rate appears to lower than mentioned. The percentage of returning participants was 20% in the year 2013 and has been falling since then with only 15% returning participants in year 2017. This trend can be seen in the figure 5.

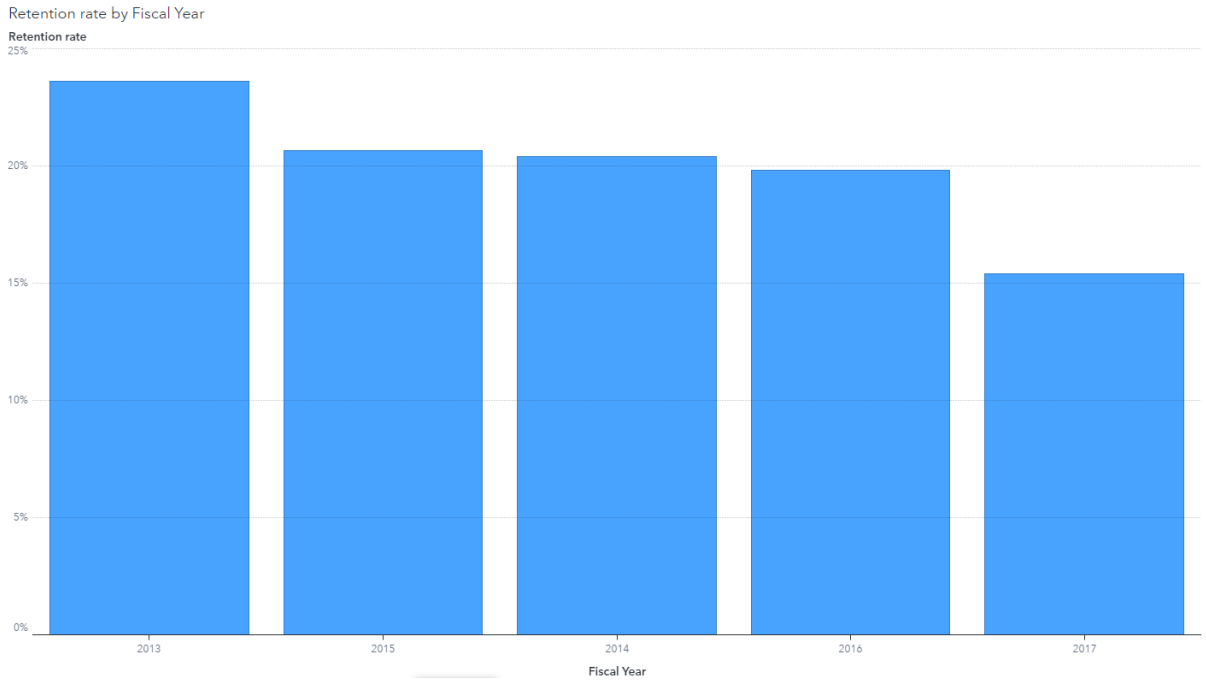


Figure 5 Retention Rate by Year

Data Analysis

We start the analysis by looking at the donations received each year and total number of participants each year. In figure 6, it is clear that both donations and number of participants have reduced over the span of five years. As mentioned earlier, the number of participants has reduced by about 30% from 2013 to 2017 and total donation amount is reduced by about 15% to $55,170697.43.

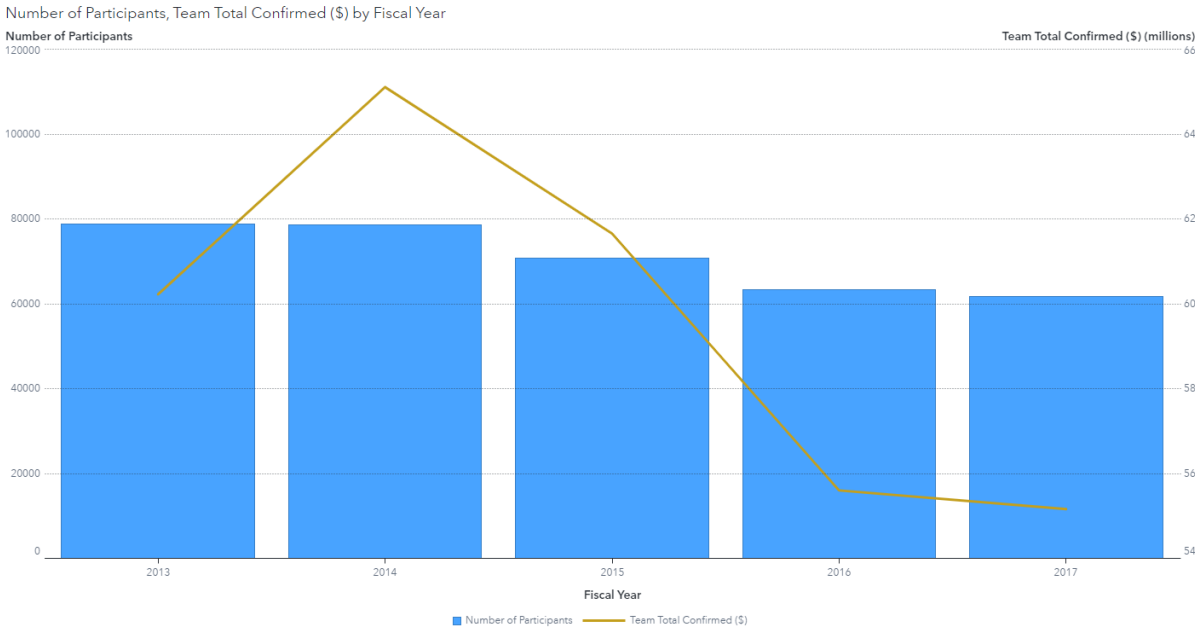


Figure 6 Number of participants and Total donations

Team Division: The teams that participate in the event are divided into various categories. Teams contribute more to the cause than individual donors, especially corporate teams. From figure 7 it is evident that corporate teams contribute much more than other teams. There are almost 8000 corporate teams raising more than $141 million over five years while there are more than 21000 friends and family teams which contribute more than $125 million over five years. That is about $18,000 per corporate team and about $6,000 per friends and family team. This confirms that fact that corporate teams are much more valuable to Bike MS than other teams.

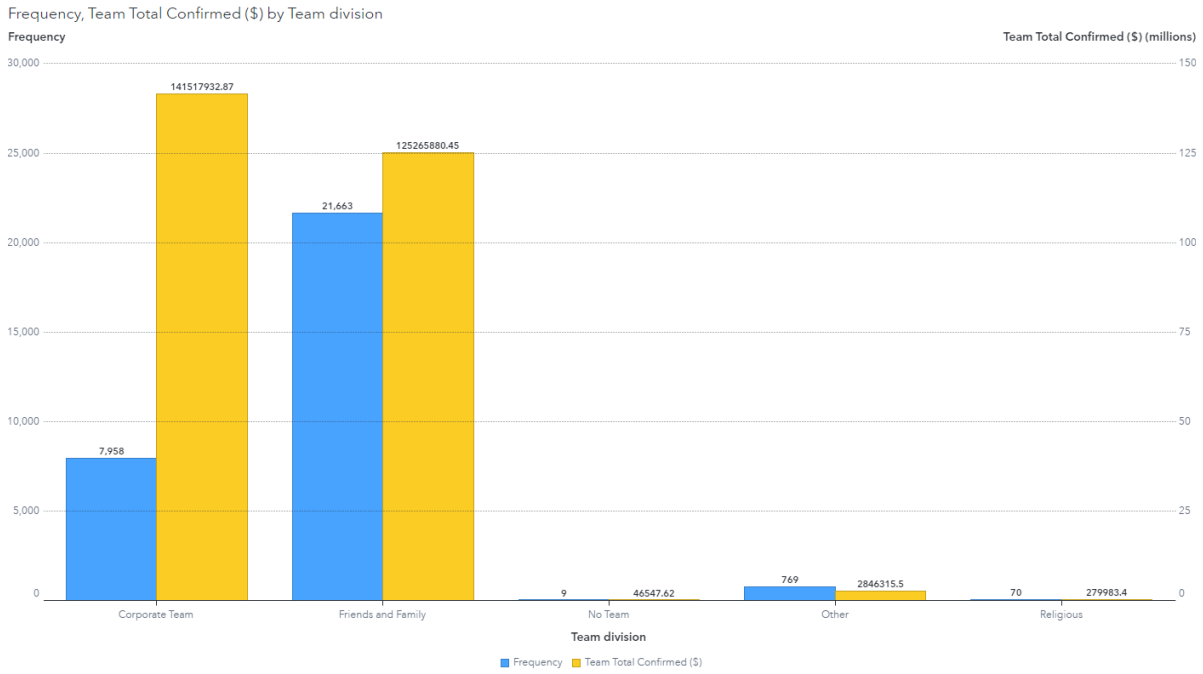


Figure 7 Team division and Contribution

Looking at the above graph we need to check if size of the team affects the total donation by a team. According to client, the team of 10 or more riders is more valuable to the Bike MS than any other team.

Team Size: From figure 8 it is evident that the maximum contribution comes from teams with more than 10 member every year except 2017. However, the donation amount decreased steeply in the years 2016 and 2017 with contribution in 2017 being lower than that of teams with 5 to 10 members.

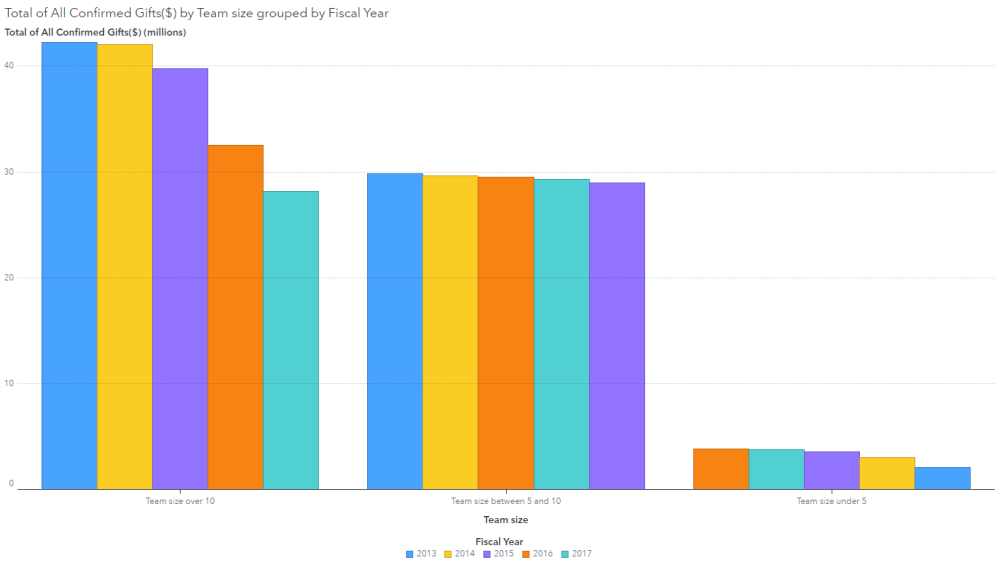


Figure 8 Total confirmed gifts by team size

On further analysis we find that the number of teams with 10 or more members has been steadily decreasing steadily every year with less than 2% of teams having more than 10 or members. This is not surprising as the number of participants in team sizes has been consistently falling year over year. We can conclude that NMSS has not been able to retain teams of 10 or more participants.

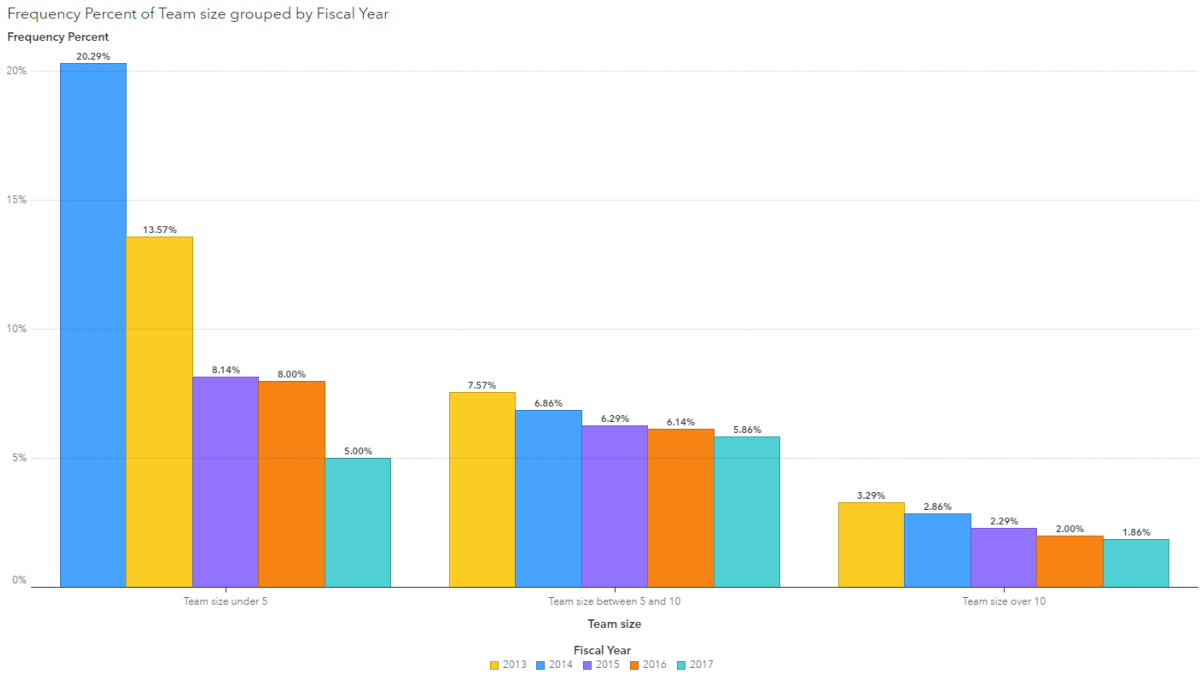


Figure 9 Frequency of team sizes by year

Participant's occupation: As noted previously that highest number of participants come from engineering and healthcare background we check if the trend is same across all years. Unsurprisingly, we can see in figure 10 that professionals form these two occupations bring in the most charity every year. Although, the funds raised by them has been decreasing consistently every year.

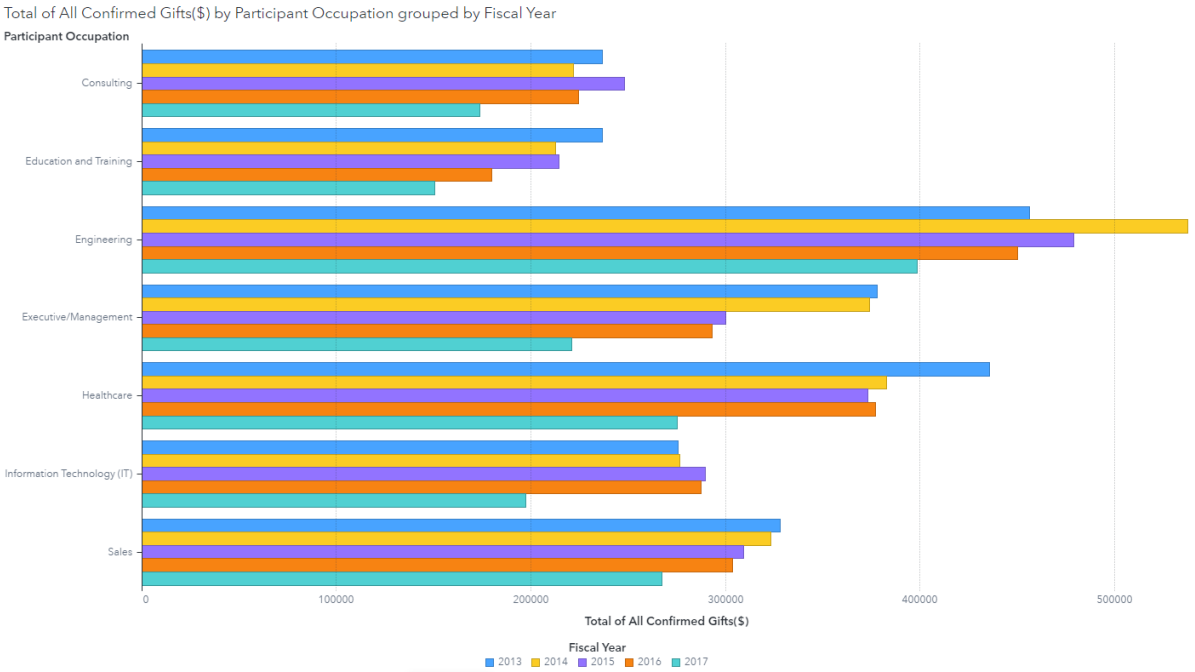


Figure 10 Participant's occupation and funds raised by year

Corporate Teams: As mentioned earlier by the client that corporate teams of more than 10 members is seven times more valuable to the cause than other teams and are the primary source contributors to the charity. We shall take a deeper look into which corporations contribute most to the charity.

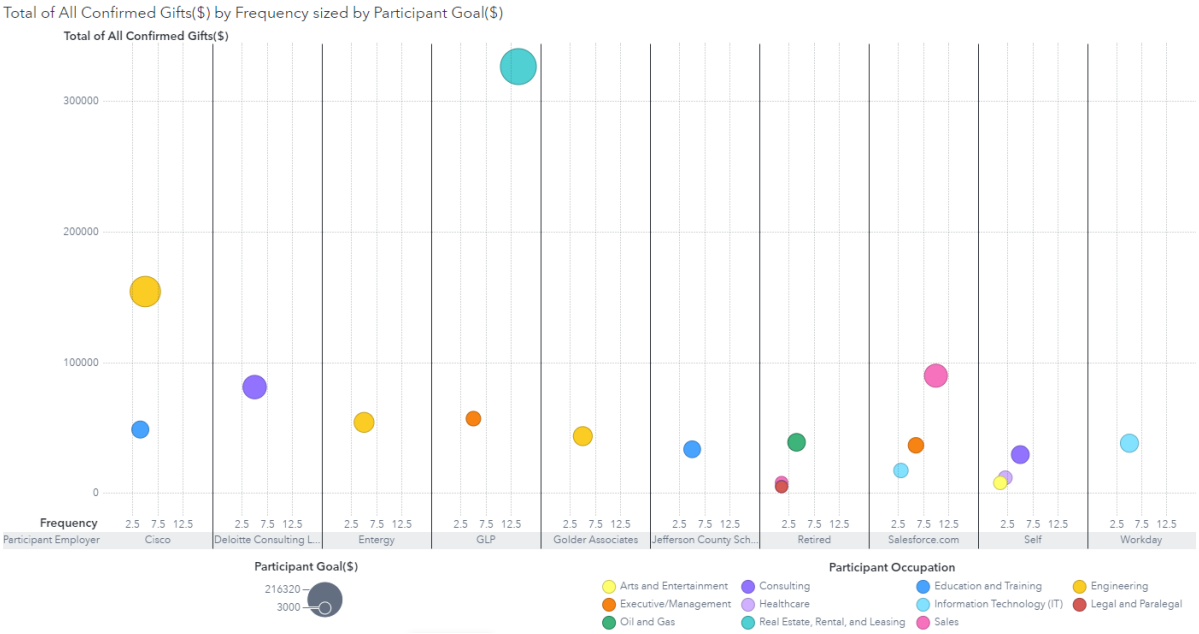


Figure 11 Corporate and Occupation analysis

We see in figure 11 that participants who are real estate professionals and working at GLP contribute achieve the goal and beyond managing to raise over $325,000 while the target was $210,000. We had noted that engineers contribute highly to the client's cause and form figure 10 we can see that engineers working at Cisco contribute the highest going beyond their goal of $148,000 and raising a little over $154,000.

Corporate Team Analysis: After completing the analysis of corporations and occupations that contribute highest to the charity, we shall look which corporate teams manage to raise funds every year. From figure 12 we see that Team BP consistently outperform other teams a significant margin They raised highest amount of funds in 2014 but has been since declining every year. It is noteworthy that team Houstonian Club Hammerheads have raised second highest gift until 2016 but in 2017 Team Noble drilling has raised more funds.

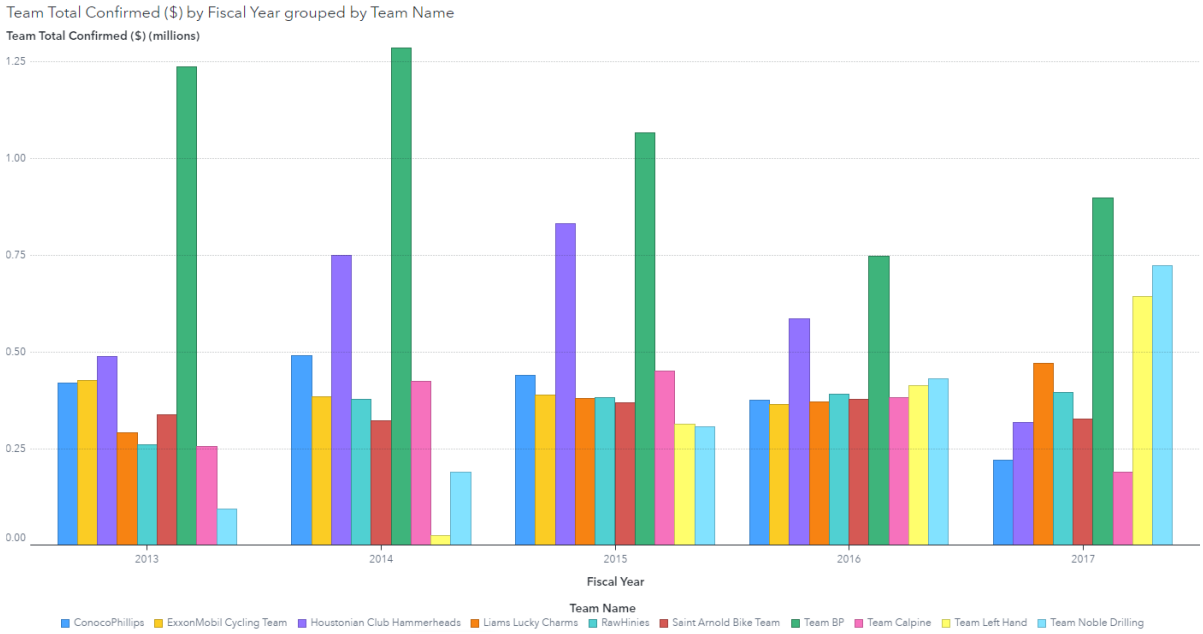


Figure 12 Corporate Team contribution by year

Gender Analysis: As we saw before there are about 1.5 times the number of male participants than female participants. In figure 13 we can see that male riders raise more than double the funds than female riders. Average male rider raises about $930 while an average female rider raises $740. According to studies females are 3 time more susceptible to MS than men as we stated before. NMSS is losing on a big target market here.

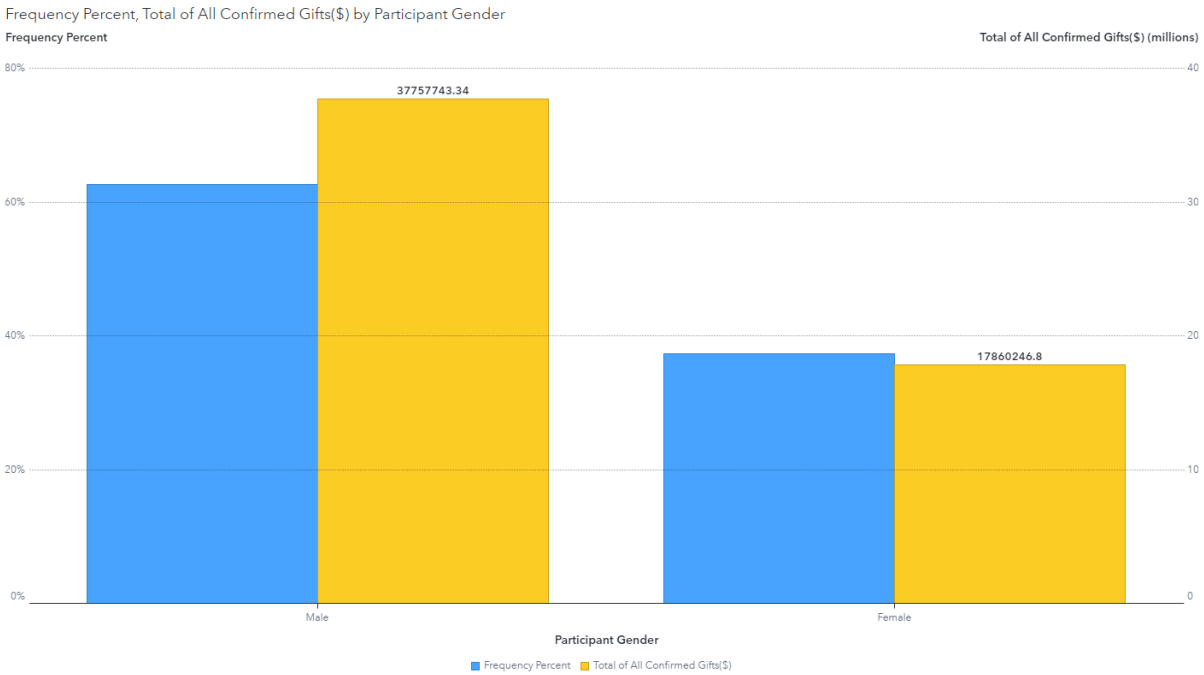


Figure 13 Funds raised by gender

We shall take a deeper look into the female professionals and their occupation. As seen in figure 14 female riders working in the Healthcare industry followed by Education and Training. We can assume that riders working in these two industries are more informed than riders working in other industries and hence the higher participation rate.

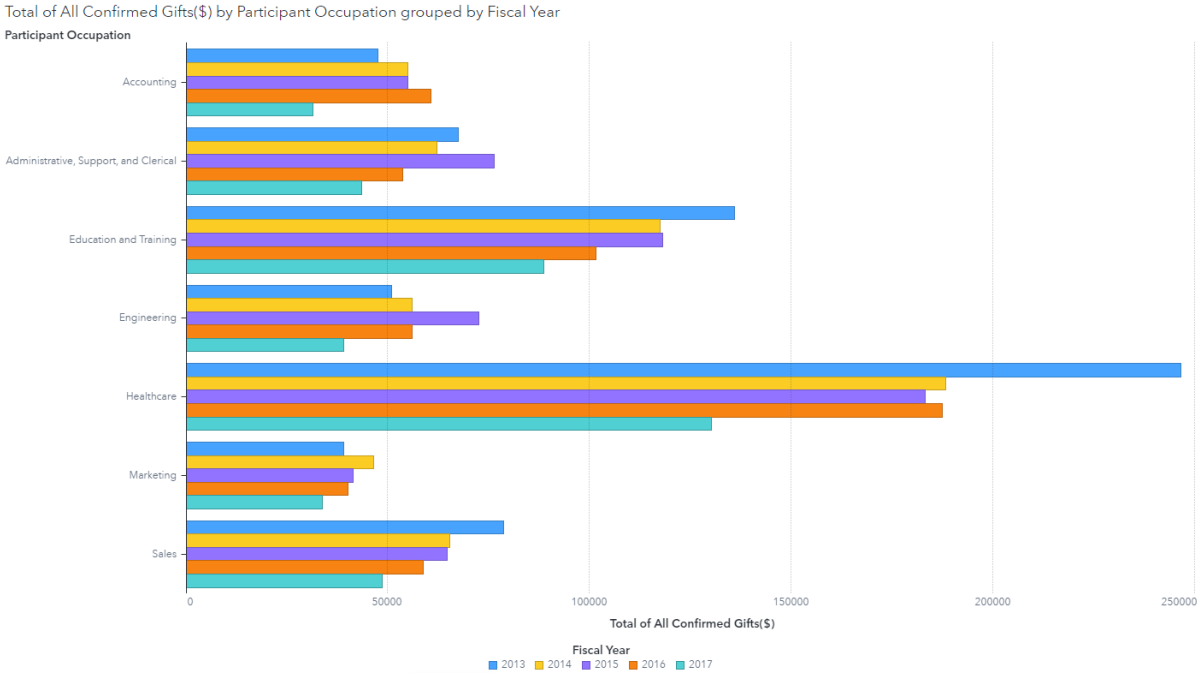


Figure 14 Female participant's occupation and funds raised by year

State: After discovering and analysing corporate team participation and their donations and effect of gender on the donations we shall look at which states raise the more fund.

From figure 15 we see that most donations and participations come from the states of California and Colorado. According to Wallin et al. number of MS patients per capita are higher in Eastern States than other states followed by Midwest, South and west regions (2019, p. 1029).

As we saw in initial analysis that 88% of the participants had some connection to MS and this should be reflected when we check the statistics state wise. However, we see that western state of California has the highest participation of 23,500 riders and also has the highest raised funds by a state with just over $23 million. This is closely followed by Colorado and Florida with 15,000 riders and 6,500 riders respectively & raising about $15 million and $4 million respectively.

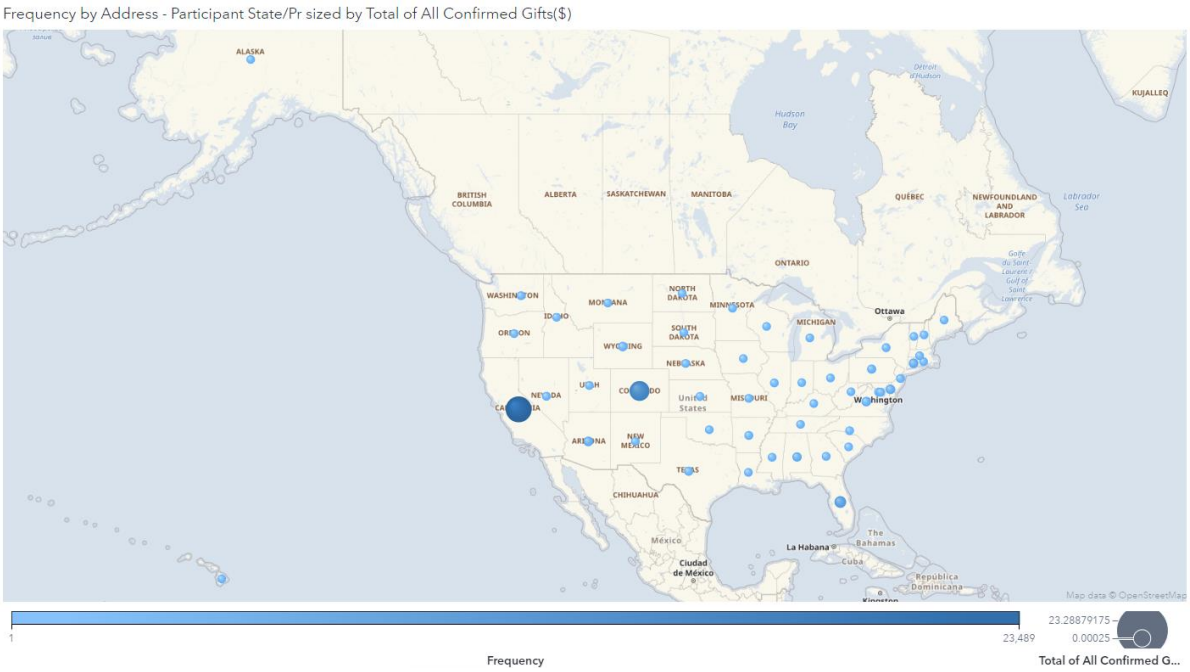


Figure 15 Number of participants and donations by state

Bike MS events: We shall now see which bike events collects highest gifts every year. From figure 16 it is clear that TXH Bike Event raises highest funds each year with over $21 million in 2013 and over $16 million in 2017. Bike event which raises second highest funds each year is PAE Bike Event which raises less than 25% of what TXH Bike event raises. NMSS

should use the tactics deployed at the TXH event to increase the funds raised at other events.

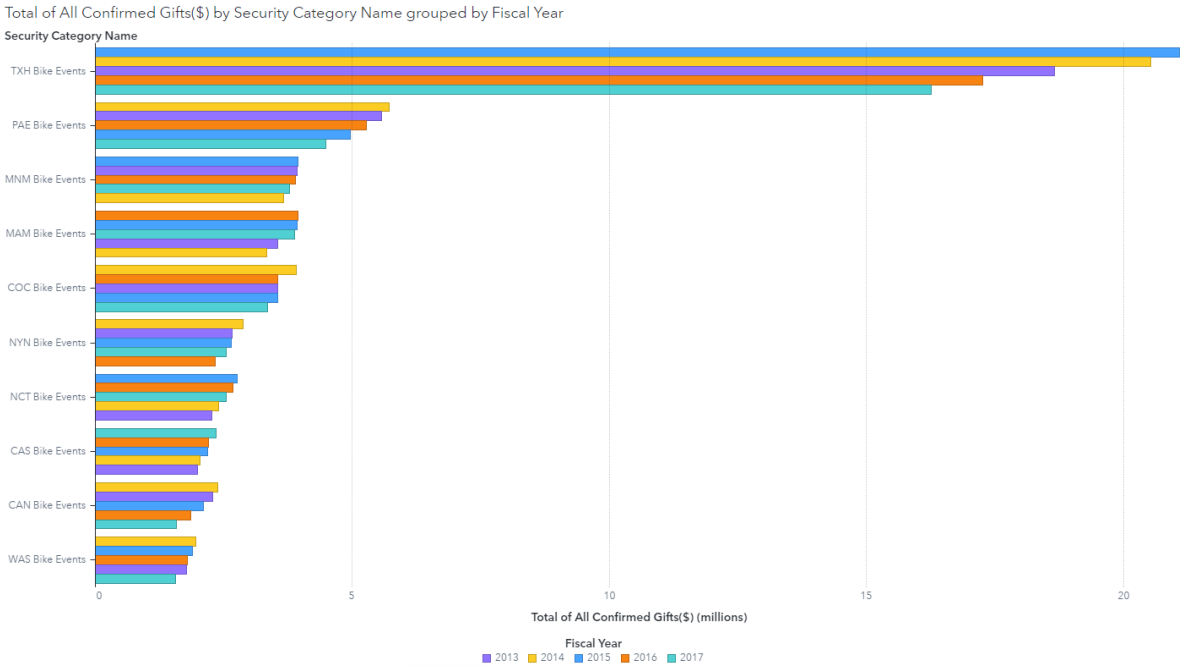


Figure 16 Funds raised at Bike events by year

Active and Inactive Registrations: We need to also look into how active and inactive registrations we have for these events. Unsurprisingly, we see in figure 17 that TXH Event has the highest active registrations (~17000 in 2017) but also the highest inactive registrations (800 in 2017). Other events have less than half the registrations.

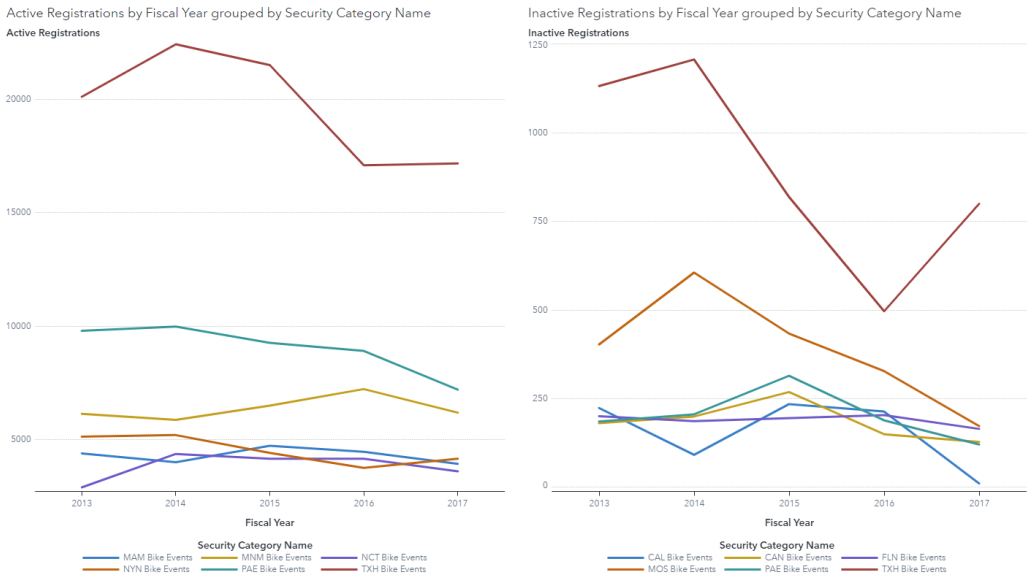


Figure 17 Active and Inactive Registrations by year

We also note that there has been a steep decline in active registrations from 2015 to 2016. This dip in active registrations need to be investigated.

Email Campaign: The client has done email campaign, outcomes of which are provided to us. Figure 18 shows a direct correlation between the number of emails sent and the total funds raised. We also see that two third of the participants accept the email invite. We conclude that email campaign has a positive effect on the participation rate and in return on total donations.

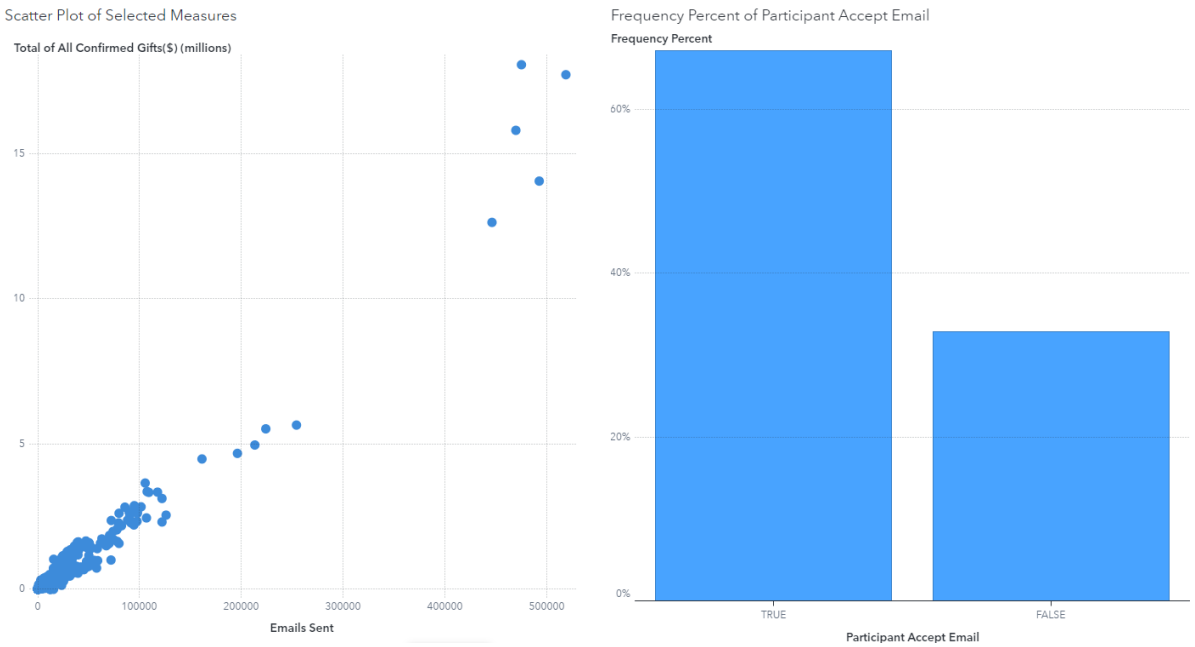


Figure 18 Email campaign and acceptance rate

Cluster Analysis: We try to segregate our participants using cluster analysis to understand which attributes bring the highest donations for the client. We use clustering method in SAS to make distinct categories of participants. The clusters are based on variables State, Team Size, and Security Category Name.

Taking the variables, we create 5 clusters. The attributes of the five clusters are given in the table below:

Cluster ID	State	Team Size	Teams	Security Category Code
1	Pennsylvania	Under 5	37	PAX Bike Event
2	Massachusetts	Under 5	72	MAM Bike Event
3	Minnesota	Over 10	327	MNM Bike Event
4	Texas	Over 10	40	TXH Bike Event
5	Michigan	Under 5	23	MIG Bike Event

All clusters have differentiating characteristics. Figure 19 shows parallel coordinates plot which helps visualise the clusters.

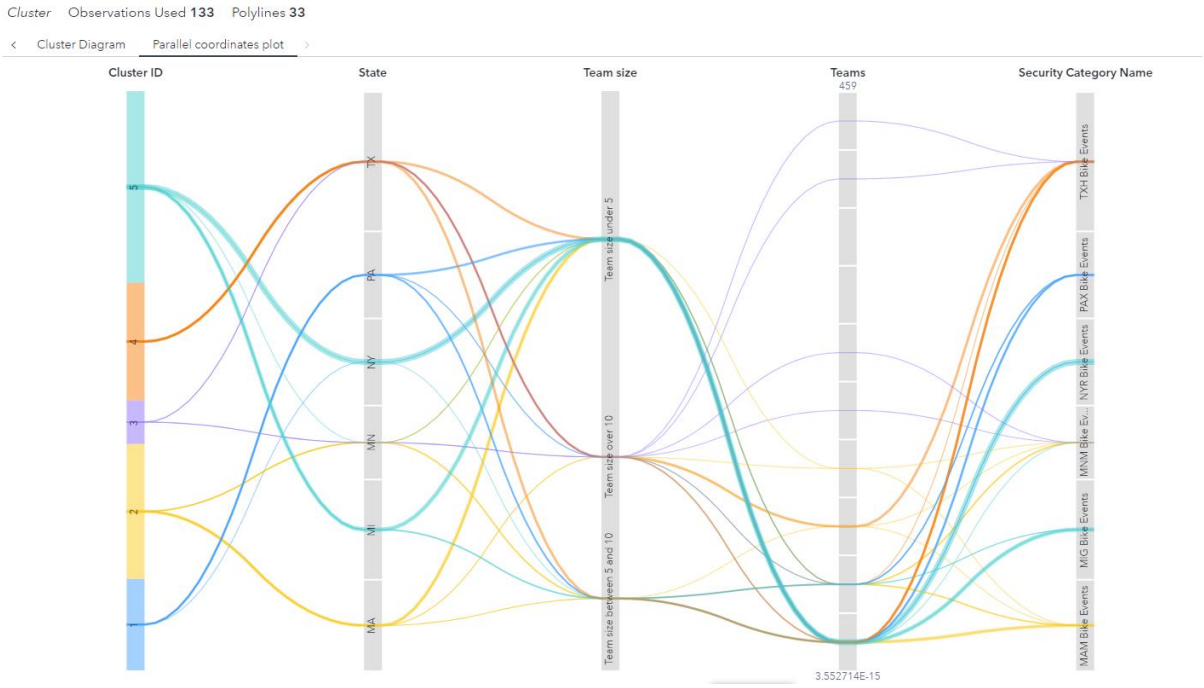


Figure 19 Cluster Analysis

We examined these clusters on the basis of frequency of participants, total donations. Figure 20 shows the frequency percent of participants and total donations through each cluster. We see that cluster 5 has the highest percent of participants with 33% but lowest funds raised of less than $5 million while cluster 3 only 8% of participants but raises highest funds with $92 million which is almost 5 times the funds raised by cluster 2.

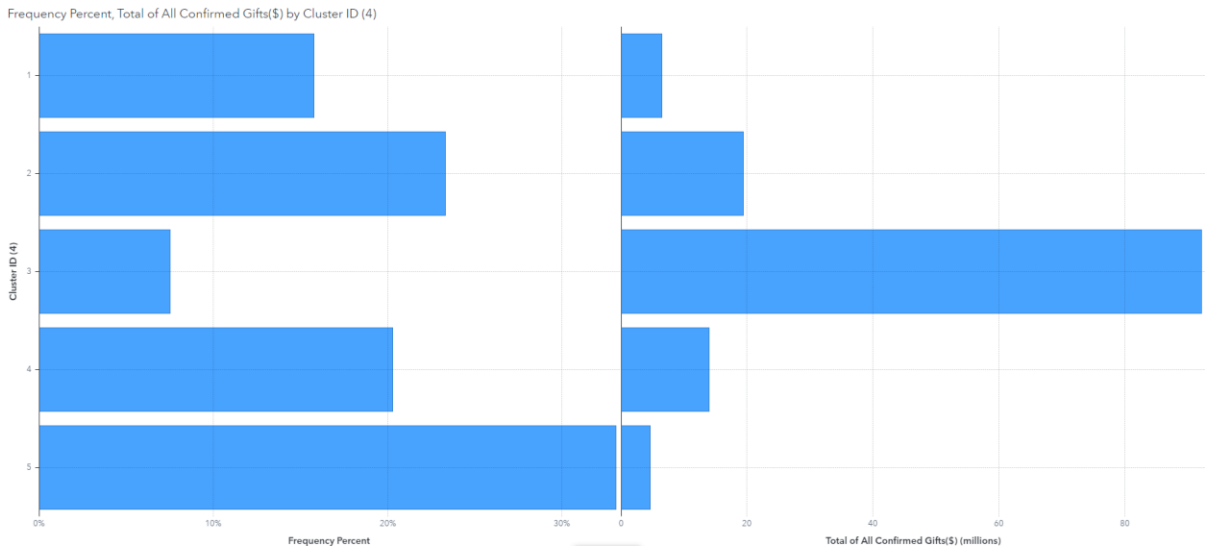


Figure 20 Frequency percent and Total gifts by cluster ID

We check the number of emails send to participants in each cluster in figure 21. We see a direct correlation between emails sent and number of participants in each cluster. The emails sent to cluster 3 are significantly higher than emails sent to all other clusters combined with cluster 5 receiving the least number of emails.

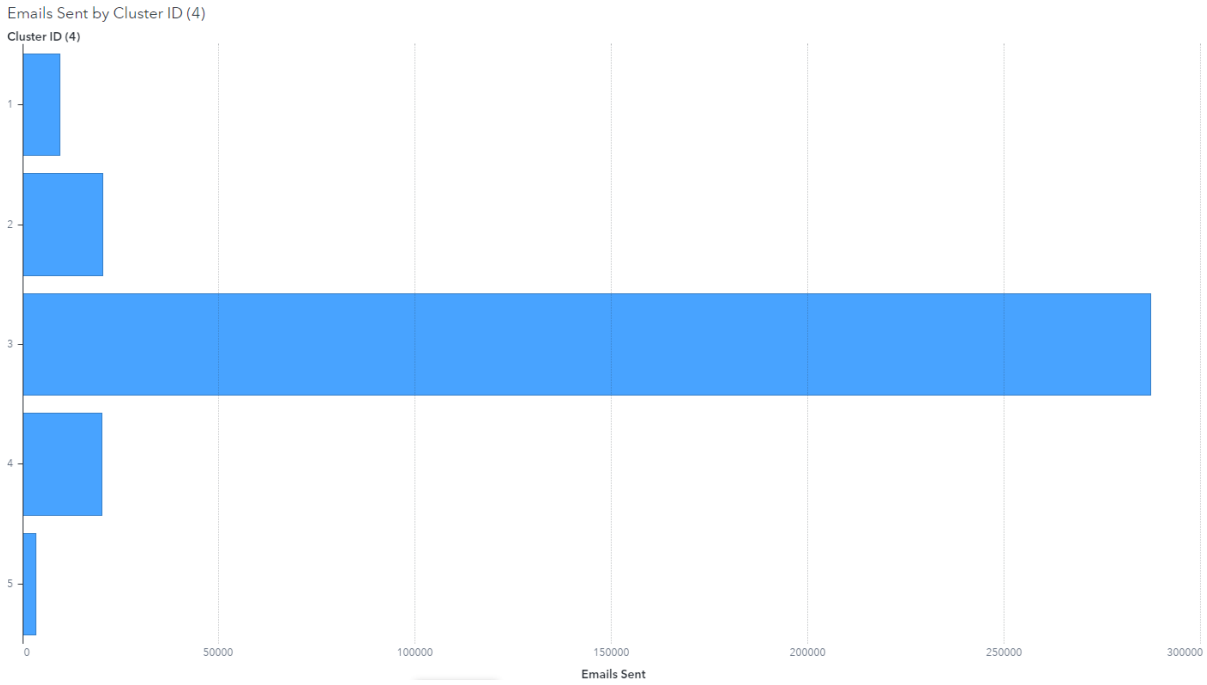


Figure 21 Number of emails sent by Cluster ID

This proves that the email campaign works and should engage with other participants too in order to increase the participation rate and in return total amount of donations.

We can conclude that NMSS needs to emphasize on email campaign and maintain large number of teams with team size of 10 or participants to increase the amount of donations received in all the bike events.

Conclusion and Recommendations

Conclusion

Based on the analysis of the data provided by the client we have concluded the following:

- Most of the participants that attend the events are directly related to MS patients or have MS. But they are not the ones that bring highest overall donations.
- Corporate teams division are the largest donors of the events each year and raise the highest funds.
- Teams with average size of 10 or more are the ones which raise the highest amount of funds while only accounting for less than 2% of all teams.
- Participants working in engineering, healthcare and sales professions are the leading the contributors of the MS Bike events every year. The highest among them is engineers from Cisco followed by professionals from GLP, Deloitte, and Salesforce.
- The leading corporate teams that raise the highest funds are oil companies. The highest among them is Team BP in terms of total donation amount.
- It is male dominated event with 63% males and only 37% females and donations made by males are double than that made by females. Female professionals in healthcare and education raise the highest funds.
- The western states have more successful events in terms of raised funds especially California and Colorado compared to eastern states. According to surveys, the Eastern states have higher number of cases of per capita than other regions of the country.
- The TXH bike event is the most popular and successful event of the year in terms of both, number of participants and total funds raised. The main motivator for the participants to engage in Texas is direct connect to MS in some way.

Recommendations

Based on our analysis Pace Consulting would like to make the following suggestions to help increase the number of participants and donation amount:

- Expanding on NMSS' initial observation of big corporate teams being more valuable. NMSS should try to recruit more teams from petroleum industries as they perform better in terms of donations. The client will be able to recruit more participants from the same industry as they already have organisations participating from therein.
- NMSS is missing the opportunity in the East, South and Midwest as there are higher number of patients in these regions than the west where they have more successful events. NMSS should increase their marketing in these regions and spread awareness. As observed before, the most participants are motivated when they know a diseased which will also be greater in these regions.
- As the TXH bike event in Texas is their most successful event on the calendar, NMSS should adopt similar strategies for events in other states to attract a wider audience and have a comparable result to TXH bike event.
- Since women are more likely to be affected with MS than men NMSS should expand their marketing to include more women and bring the ratio of male to female closer to 50%. The client should spread awareness to reach more women especially in healthcare and education industry.
- As the email campaigning is success the client should invest more in it in all the regions to increase the number of participants and funds raised. Furthermore, NMSS should expand into other forms of advertisement such as social media. According to the data provided the client does run Facebook campaigns. This should expand into all other social medias such as twitter and Instagram.
- Lastly, the client should start inclusive marketing campaigns to target young to middle aged working professionals instead of the niche (middle aged males with higher salaries) in the country to reach their participant and donation targets.

Limitations and Future Scope

Pace consulting is positive about the quality of the report provided to the client. However, the analysis report has few limitations. Firstly, the quality of the data is low which resulted in overlooking a few variables, hence affecting the overall analysis. The data also does not contain a unique row identifier which limits the analysis as the datasets could not be joined. Due to time constraint the some of the aspects of the data and problem were ignored and only the important points were analysed.

The report investigates cause behind the decreasing number of participants and donations and provides an insight. The observations and recommendations should help the client reach their goal for the same in future events. Data of marketing campaigns can be further analysed to understand which campaigns are successful, create awareness and attracts more participants and in return increase donations.

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